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General Surgery

The Preoperative and Postoperative Care of the Diabetic Patient

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THE care of the diabetic patient in situations requiring surgical treatment cannot be reduced to any simple set of rules. Not only will the condition requiring operation and the nature of the surgical procedure have their influence, but the pattern of the particular case of diabetes will have much to do with determining the response of the patient to the stress. In short, diabetic patients differ from each other and may respond differently to surgical treatment. For this reason it is important to inquire carefully into the past behavior of the diabetes before formulating a plan of management. A physician accustomed to the management of diabetes should make such an evaluation and supervise this aspect of the patient's care in cooperation with the surgeon.

Diabetic patients may be divided into two large categories, although some may

The care of the diabetic patient undergoing operation cannot be reduced to any rigid set of rules. It is best accomplished through cooperation between the surgeon and the physician accustomed to the problems posed by this disease in the case under consideration.

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not fit clearly into either group. The first category will be termed "juvenile" or "insulin-sensitive" and the second, "adult" or "insulin-insensitive."

The age at onset of diabetes usually gives a good clue as to the manner in which the disease is likely to behave. Ordinarily, diabetes beginning in childhood or young adult life is relatively difficult to control; ketosis develops with little provocation; satisfactory nutrition can be maintained only by use of insulin; and the dosage of insulin must be adjusted exactly, since an excess of a few units may cause hypoglycemic symptoms and a deficiency of a few units may permit heavy glycosuria and ketogenesis. Diet alone will not satisfactorily control the metabolic derangements in these patients. They do not respond to the sulfonylureas, tolbutamide (orinase) and chlorpropamide (diabinese). Besides "insulin-sensitive," patients with this pattern of diabetes have been called "insulin-dependent diabetics" or "juvenile diabetics." While the latter term is quite descriptive, this pattern occasionally develops later in life; and it seems paradoxic to describe a person in whom diabetes of such a pattern develops at the age of 50 as a "juvenile diabetic." For this reason "insulin-sensitive" is perhaps somewhat preferable.

In contrast, in many cases of diabetes having its onset in adult life ketosis develops only under the stress of some severe illness or trauma. Patients of this group who require insulin often show relatively little change in concentration of blood sugar or amount of glycosuria with substantial changes in the insulin dose. When insulin is withdrawn, such persons may exhibit considerable glycosuria but little or no ketonuria. Frequently satisfactory control of glycosuria and maintenance of nutrition can be accomplished by modest restriction of diet. In addition, a generous proportion of these patients obtain a hypoglycemic effect from the sulfonylureas. During the first one or two years after the onset of diabetes in childhood the disease may behave in a stable or "adult" manner for a number of months. Such stability may disappear, however, with the stress of trauma or illness and all children should be regarded as having juvenile, or insulin-dependent, diabetes.

Diabetics in the first category must be watched closely during and after an operation. Insulin must be prescribed with great precision. Nutrition is precarious; a few hours of heavy glycosuria in such cases may indicate considerable destruction of protein and loss of nitrogen. Patients in the second category require somewhat less rigorous supervision, but in some circumstances diabetes ordinarily stable may become erratic and unstable in its behavior.

The nature of the surgical problem has much to do with the formulation of a plan of management. Infections, fractures and hyperthyroidism are notorious for rendering diabetes more severe and unstable. The insulin requirement may be doubled or tripled in these circumstances, and even the best efforts at controlling the diabetes may fall short of the mark. In such situations it may be desirable to accept a less than ideal degree of control of the diabetes and proceed with surgical measures that will correct the aggravating factor. The decision as to the time of operation often is difficult, depending as it does on a balance of the benefits of early operation against the possibility that better control of the diabetes might be achieved during a period of delay.

Generally, however, the best possible control of the diabetes before operation is desirable. This means not only that glycosuria and hyperglycemia should be corrected so far as possible but that the patient's nutritional state should be considered. Inadequacy of nutrition due to

a debilitating illness or from a period of uncontrolled diabetes should be treated vigorously for several days if possible, with supplemental feeding and sufficient insulin. A poor state of nutrition increases the risk for the diabetic more than for the nondiabetic patient, since even slight exacerbation of the diabetes by the stress of operation would result in drains on already depleted stores of protein.

The presence of degenerative complications of diabetes may require special consideration. Diabetic neuropathic conditions and peripheral arteriosclerotic changes may render the legs and feet vulnerable to injury by pressure or heat, and precautions should be taken to protect these extremities during the operative and postoperative periods. Coronary artery disease is common among diabetic persons, and the presence of diabetes worsens the prognosis of myocardial infarction. The possibility of myocardial infarction during the postoperative period should be considered in the event of otherwise unexplained hypotension or cardiac arrhythmia, or of unexpected glycosuria. Diabetic nephropathic change may impair the ability of the renal mechanisms to handle excesses or deficits of water or electrolytes, and it also contributes to impaired nutrition through proteinuria.

The selection of the immediately preoperative dose of insulin is all-important. A number of factors must be taken into consideration: the usual dosage of insulin required by that patient, the time of the operation, and the probable duration of the surgical procedure and anesthesia. In general it is desirable to schedule an operation on a diabetic patient as early in the day as possible. Although fasting may lessen hyperglycemia and to some extent diminish ketogenesis, it favors depletion of hepatic stores of glycogen and thus may render the patient more susceptible to both hypoglycemia and ketogenesis under conditions of stress. Early scheduling of the operation and avoidance of unnecessary fasting are particularly important for the patient with juvenile or insulin-sensitive diabetes. If the operation must be scheduled later in the day and if feeding by mouth is undesirable, dextrose should be given parenterally, with the amount of insulin needed to provide for its utilization. The hyperglycemia resulting from parenteral administration of dextrose does not have the serious significance of hyperglycemia caused by uncontrolled diabetes, but will act to diminish ketogenesis, especially if insulin is given in conjunction with it. On the other hand, the intravenous administration of dextrose invalidates the blood sugar level as the physician's index of the status of the diabetes at the moment; and if given in large enough quantities to cause heavy glycosuria, it will favor dehydration.

Whether to withhold dextrose until after operation or to administer an infusion slowly during the operation and the postoperative recovery period is a matter of choice. In most instances it is simpler to postpone the use of dextrose and obtain a determination of the blood sugar level in the hour after completion of the surgical procedure. Knowledge of the concentration of blood sugar at this point may be helpful in evaluating the effect of the operation on the status of the diabetes, and it guides the administration of insulin during the next twelve or twenty-four hours.

If this course of action is chosen, and no dextrose is to be given during the operation, the preoperative dose of insulin should be modest. The occurrence of hypoglycemia during the course of anesthesia might not be recognized and could easily be catastrophic. Usually it is safe to give one-fourth to one-fifth of the usual day's dose in the form of a slowly acting insulin such as protamine or ultra-lente.

On the other hand, even such a relatively small dose as this might cause hypoglycemia in the unstable diabetic patient, particularly if the surgical procedure is prolonged. If the diabetes has been especially unstable in the past, it may be preferable to guard against hypoglycemia during operation by administering an infusion of 10 per cent dextrose slowly during this crucial time. In this event a somewhat larger dose of insulin may be given, with a small proportion of it in a more rapidly acting form.

During the postoperative period the patient should receive carbohydrate in amounts equal to 150 to 200 gm. of dextrose in each twenty-four hours. Furthermore, it is preferable that this be given as continuously as possible. Periods of complete fasting for more than six or eight hours increase the risk of insulin reactions and favor the development of ketosis. The diabetic patient has all of the usual problems of nutrition after surgical intervention and, in addition, presents the possibility of further drain on his protein stores and waste of calories through glycosuria if the diabetes is not reasonably well controlled. In general, however, a minor degree of glycosuria is preferable to hypoglycemia reactions.

Ordinarily the amount of insulin needed during the entire day of operation is approximately equal to the usual daily dose. Most often this is given in divided doses of a rapidly acting form, such as the crystalline, at intervals of four to eight hours, depending on tests of the urine at the moment. The insulin requirement may be greatly increased by some procedures, particularly thyroidectomy for Graves' disease. Surprisingly, a hemorrhoidectomy or other seemingly minor procedure sometimes may cause a threefold or fourfold increase in the need for insulin, while more extensive abdominal procedures may have little effect on the status of the diabetes. An amputation may cause an abrupt rise in insulin requirement by virtue of the trauma involved; but if active infection or gangrene have been present, amputation may result in a fall in insulin requirement. In any event, the attending physician should be alert for all possible variations in the status of the diabetes and ready to change his plans accordingly.

Diet during the convalescent phase may pose a problem. Ordinarily diets prescribed for diabetic patients exclude all sugar in order to minimize postprandial hyperglycemia and glycosuria. There may be a real problem, however, in providing appealing menus within the further restrictions imposed by the operation without including some sugar. This applies particularly to the low-residue diets used after gastrointestinal procedures. In these circumstances it is often desirable to have the surgeon order the diet appropriate for the stage of convalescence from the particular surgical procedure involved, without regard to the presence of diabetes. Later, when the patient is able to eat a more varied diet, he can return to his usual diabetic restrictions.

RÉSUMÉ

Le cas du diabétique devant subir une intervention chirurgicale ne saurait être ramené à des règles rigides. Il exige la collaboration entre le chirurgien et le spécialiste habitué aux problème que pose cette affection.

RESUMEN

Cuando un enformo diabético ha de sufrir una operación no puede ser sometido a reglas estricatmente rígidas. Lo mejor es la cooperación entre el cirujano y el internista experto en los problemas que plantea esta enfermedad.

SUMARIO

O tratamento de um paciente diabetico não pode ser estebelcido por principios rígidos. Vale melhor estabelecer estreita

cooperação entre o cirurgião e o clínico habituado a esses problemas.

ZUSAMMENFASSUNG

Die Behandlung von Diabetikern, die einer Operation unterzogen werden sollen, lässt sich nicht in einem starren System von Regeln zusammenfassen. Der beste Weg ist durch die Zusammenarbeit des Chirurgen mit einem Kollegen gegeben, der mit den durch die Erkrankung entstehenden Problemen vertraut ist.

When our political friends wish to compliment the medical profession, and seek statistical proof of our skill as a text for their eulogies, they point to the progressive fall in the general death rate, and the more rapid decrease in infant mortality. We are then obliged to confess, in acknowledging the tribute, that medicine is responsible in part only for the change, and that improved social and economic conditions and a steady decrease in the dangers which beset the helpless must also claim their share. But are increased longevity and wholesale survival in truth matters for congratulation?

The psalmist who said "the days of our years are three score years and ten" wrote of conditions already civilized. If we infer the natural span of life from its duration among peoples who still live naturally, and from physiological reasoning, it is about forty-eight years. At forty-eight the reproductive power of woman ceases and of man starts to decline; metabolism is no longer regulated automatically by the needs of the body, but tends to run riot, usually to a deposition of unwanted stores; elasticity disappears progressively from the circulatory, optic, and intellectual systems. The human brain may function with mechanical precision up to four score years and ten; but in most cases the machine will perform only those operations, varied and intricate though they may be, for which it has been prepared in the first forty-eight years of building and tuning. It cannot adapt its jigs and spindles to new production, or work on unaccustomed fuel. Judges, writers, and politicians often do their best work in their later years, but it is a more polished version of their earlier performance. It is rare indeed to find men like Masaryk and de Morgan entering at sixty new and phenomenally successful careers. By the power of his brain alone can a man over forty-eight justify his continued existence to himself and his fellows.

—*Ogilvie*

Haustrocecal Invagination as a Cause of Intussusception

Report of Two Additional Cases

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INTUSSUSCEPTION in an adult is sufficiently unusual to arouse interest in any particular case. So rare is it that Brayton and Norris (1954) estimate that intussusception in persons over 14 years of age occurs in 1:5,000 to 1:30,000 of all hospital admissions in America. Haustrocecal invagination as a cause of intussusception has received scant attention from writers in English, though a number of cases have been described in the Italian and German literature. I reported a case of haustrocecal invagination several years ago (1953) and have recently observed 2 more. As Danhauser and Kelly (1950), in their review of 665 cases of intussusception in adults published by English and American writers from 1900 to 1947, found only 25 cases of the cecocolic type and did not mention haustrocecal invagination as a cause at all, it was thought worthwhile to publish these 2 additional cases.

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Haustrocecal invagination as a cause of intussusception seems sufficiently rare to warrant reports of two additional cases. In these cases the condition was considered due to inflammation of the bowel wall producing disordered peristalsis, which caused invagination of a mass of lymphatic tissue into the intestinal lumen. Further peristaltic action converted the invagination into an intussusception.

REPORT OF CASES

CASE 1.—A man aged 20 was admitted to a medical ward with a history of bouts of central abdominal colicky pain over a period of twenty-four hours. Between these bouts of severe colic, which made him roll about the bed, he was quite comfortable; he had diarrhea, having defecated ten times the day before admission, but had not noticed whether there was any blood in the stools. The diarrhea had settled by the time he was admitted to the hospital. He had eaten lightly the day before, had not felt sick and had not vomited; he could not trace any cause for the attack. There was no relevant past history.

Examination revealed the patient to be healthy looking. He was afebrile, and the pulse rate was normal. The tongue was slightly furred, but there was no halitosis. There was mild tenderness in the right iliac fossa and the lower part of the abdomen generally, but there were no other abdominal signs apart from multiple high-pitched bowel sounds.

Rectal examination revealed no abnormality; the urine was normal to ward testing. A diagnosis of dysentery was made, and the patient was treated by fluids only by mouth and oral streptomycin, 1 Gm. twice daily. During the following day the attacks of colic continued at intervals; the pain was acute and doubled the patient up, and at times he was rolling in agony; it was situated below and to the right of the umbilicus. There was still no nausea or vomiting, and there had been no bowel action since admission.

Examination showed a flushed but still afebrile patient with a pulse rate of 60 to 80 between attacks; apart from tenderness in the right iliac fossa and increased peristaltic sounds there were no physical signs whatever, either in the abdomen or elsewhere. Examination of the stools and a white blood cell count taken the previous day showed no abnormality. In view of the atypical features of the case, with the localized pain and tenderness in the right iliac fossa, laparotomy was decided upon. Further examination just before operation, however, revealed a tender mass in the right side of the abdomen at the level of the umbilicus, measuring 4 by 2 inches (10 by 5 cm.), which moved with respiration but could not be pushed back into the loin. A tentative diagnosis of intussusception was made, which was confirmed at laparotomy.

Operation.—A right paramedian incision was made and the lump delivered into the wound. It proved to be a cecocolic intussusception that was easily reduced, leaving an edematous dimple on the anterolateral surface of the cecum. The iliocecal valve and appendix lay on the left side of the intussusception and were not grossly abnormal, being involved only secondarily. The appendix showed signs of mild but definite inflammation and was removed. The cecum was free for 5 inches (12.5 cm.) and was then adherent to the posterior abdominal wall. Apart from the dimple, the cecal wall was very little thicker than normal, and accurate palpation of the inside of the cecum and colon was possible; this revealed no tumor or other cause of the invagination; the small intestines, and especially the lower ileum and region of the iliocecal valve, were carefully examined but appeared quite normal. The wound was sewn up in layers without drainage.

The patient made a rapid recovery apart from some diarrhea on the fourteenth postoperative day, when he also had some frequency of micturition, later determined to be due to Staphylococcus albus and Streptococcus viridans. No abnormalities were observed on examination, and both conditions settled in a few days with sulphatriad therapy. The patient has been well since the operation.

CASE 2.—This case was similar to Case 1. Since it occurred soon after the first, it enabled me to make an accurate preoperative, diagnosis and earned me considerable kudos. The clinical picture and operative observations were so similar to those in Case 1 that they do not warrant detailed description. Only salient points, therefore, will be mentioned.

A European man aged 22 had complained for two days of diarrhea and abdominal pain, which came on in recurring bouts; he had felt sick and had vomited once. He had often suffered from a "runny tummy" and had treated himself until he realized that things were not settling down as usual. He had taken no purges recently.

Examination revealed slightly elevated temperature and pulse rates and a tender sausage-shaped mass to the right of the umbilicus. Laparotomy confirmed that this was a cecocolic intussusception. It was reduced easily, leaving the characteristic anterolateral dimple. The cecum and ascending colon had a definite mesocolon; again no tumor or other cause could be detected. The appendix was removed, and the wound was sewn up in layers without a drain. Recovery was uneventful apart from some diarrhea on the tenth postoperative day, for which no cause could be determined and which soon settled.

Terminologic Notes.—John Hunter was the first to describe intussusception (1789). The term is derived from the latin "intus" (within) and "suscipere" (to receive), and means literally a receiving within; it occurs when one portion of the intestine becomes invaginated or telescoped into another part immediately adjacent. Usually the proximal portion of the intestine is invaginated into the distal, but it may occasionally be the other way round, i.e., the *retrograde* type; there may also be several separate invaginations, forming *multiple* intussusceptions. Transient, self-reducing invaginations probably occur in normal intestines; Alvarez has demonstrated them cinematographically, and they are observed not uncommonly at operation; they probably have no clinical significance. Intussusceptions, often multiple, are also observed at postmortem examination—the so-called *agonal* type, due to disordered peristalsis at death.

Normally four types are described:

1. *Ileal:* The ileum is invaginated into itself.

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2. *Ileocolic:* An ilecileal intussusception passes through the iliocecal valve into the colon.

3. *Ileocecal:* The ileocecal valve is the apex of the intussusception.

4. *Colic:* The colon is invaginated into itself.

In any detailed consideration of the subject these terms are too indefinite, merely indicating the site at which the condition occurs. A clearer and more logical description is based on the anatomic parts involved—the entering portion being mentioned first, followed by the receiving portion or intussuscipiens; i.e., ileoileal, cecocolic, sigmoidorectal, ileojejunal and jejunogastric (the latter two being retrograde types).

Etiologic Factors. — Donhauser and Kelly in the extensive review aforementioned, observed a tumor in one half of the cases. Other common causes were gastric lesions and Meckel's diverticulum. In more than one quarter of the cases, however (187 out of 665), the cause was unknown. Although a polypoid tumor, when present, is probably the initiating factor, it is not always located at the apex but may be some distance proximal to it (Wardill, 1925).

Less common causes mentioned in the literature include part of a steel screw embedded at the apex of an intussusception in an electrician who was probably in the habit of putting small objects in his mouth while his hands were busy (Burke and Williams, 1944); and abdominal injury, perhaps due to enterospasm or a haematoma (Aldis, 1944). Parry (1945) reported a case of intussusception as a complication of amebic dysentery; as the condition was reduced spontaneously, operation was not performed and no certain diagnosis was made, although the clinical signs and symptoms seemed fairly clear cut. Kerr and Kirkaldy-Willis (1946), in a discussion on volvulus of the small intestine, stated that there were 4 cases of intussusception in the 22 cases of volvulus reviewed by them. They described the dietetic habits of the African as consisting of 2 pints of semifluid maize meal in the early morning, perhaps followed by a similar meal at midday and a bigger and more solid evening meal. They postulated that distention of the intestines by the liquid overloads one or two of the bowel loops, which become displaced on exertion during the day; a volvulus is thus started, and spasmodic, irregular peristalsis completes the condition. Ogilvie, in a note at the end of the aforementioned paper, suggests that the unfixed mesentery tends to make for a more mobile intestine in the African. He considers this an important cause in the formation of volvulus.

It has been noted that intussusception is encountered during the Mohammedan fasting season in Egypt, and is most frequent at the Christmas season in Europe. Mohammedans, during the festival of Ramadan (which lasts forty days) fast from sunrise to sunset; they are then allowed to break their fast and may make quite a feast of it. (I understand that strict orthodox Mohammedans do not allow any substance or matter to enter into the body during the daytime and that this has caused difficulty in medical treatment when doctors recommended injections and ointments applied to the skin.) During the day they must fast, but they are allowed to prepare for the evening meal. It is tempting to postulate that the thought and preparation of food in a fasting person causes severe or abnormal peristalsis, which causes an intussusception on sudden gross overloading of the intestines. Intussusception, however, does not seem to be common in Kenya generally though some cases have been recorded.

It is interesting to note that the seventh case of cecocolic intussusception following appendectomy has recently been published

(Levis, 1958). When one considers how often an infected appendicular stump is invaginated at operation, it is surprising that an intussusception is not more frequently initiated by this procedure.

The anatomic and physiologic aspects of the intestines and peristalsis and its abnormalities will now be considered in more detail.

Anatomic Features.—Solitary lymphatic *nodules* are most abundant in the lower part of the ileum, the cecum and the vermiform appendix but are irregularly scattered over the rest of the intestine. Each consists of a dense interlacing retiform tissue closely packed with lymphocytes and permeated by an abundant capillary network. They are situated partly in the mucosa, *where they form slight projections in the epithelial surface.*

Aggregated lymphatic nodules (Peyer's patches) occur mainly in the small intestine and are not a noticeable feature of the large intestine. The lymph nodes of the colon and mesentery are arranged in concentric layers and follow the vascular pattern.

Physiologic Features.—Peristalsis was described by Bayliss and Starling as a wave of contraction, preceded by a wave of relaxation, passing down a hollow viscus. This implies that the contents of a viscus are always received into a relaxed segment awaiting them. Alvarez, however, has shown that this preceding wave of relaxation is not always present. Normal peristalsis consists of a series of coordinated local nervous reflexes in response to chemical and mechanical stimulation provided by food. In the intestines peristalsis is probably largely independent of extraneous nervous impulses. In animals it continues after section of the vagi and removal of the abdominal sympathetic ganglia. Stimulation of the vagi increases the tone and movement of the intestine, while stimulation of the sympathetic nervous system has the opposite effect. The tone and movement of the bowels, however, are to some extent influenced by the emotions, as is well known by examination candidates!

Active intestinal movements occur in the lower part of the duodenum, jejunum and upper ileum. The terminal ileum is fairly quiescent until food enters the stomach, when a *gastroileal reflex* is set up whereby active peristalsis then occurs, and chyme passes through the ileocecal valve into the cecum. Little movement occurs in the large intestines, the cecum and ascending colon filling passively from the ileum. After each meal a *gastrocolic reflex* occurs when powerful mass peristalsis in the colon drives the feces vigorously on to the pelvic portion of the colon, where they accumulate.

It is easy to imagine that if a segment of intestine goes into abnormal contraction or spasm as the part of the segment below relaxes, the spastic element will tend to enter the relaxed segment and be passed on as normal intestinal contents or a foreign body, and an invagination has started (Figs. 1 to 3). Various causes of this spasm can be cited—neurogenic imbalance, irritation from unsuitable food and enteritis, or a tumor attached to the bowel wall (Fig. 4). It is of interest to note that no case of intussusception due to a foreign body has been reported till recently; either it is passed per rectum or obstructs or perforates the bowel. Presumably a foreign body produces increased peristalsis, which will pass it on, or it excites so much reaction that it becomes completely stuck. Only when the foreign body is attached to the bowel wall will a combination of spasm and traction produce intussusception. Dunn and Sherburn (1949), however, have claimed that intussusception can occur as a result of the use of the Miller-Abbott tube alone, though more often some lesion is present as well as the

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tube; and the case of the steel screw embedded in the apex has been cited.

That segmental spasm can occur has been shown by pinching the intestines of animals with forceps or by electrical stimulation. Intense local spasm develops, causing a definite constriction ring that takes an appreciable time to disperse. Nothnagel claimed to have produced an intussusception in this way by local electrical stimulation of the bowel; possibly this can occur as a result of abnormal nervous impulses or nervous imbalance. Presumably no such contraction rings occur in the normal transient self-reducing invaginations aforedescribed, which are thus able to reduce themselves. MacDermott (1935) reported observing a spastic ring in the pelvic portion of the colon that formed the apex of an intussusception, apparently caused by the small scirrhous carcinoma that lay 1 inch (2.5 cm.) behind the apex.

The enteritis in the 2 cases here presented would produce inflammation and swelling of the mucosa and lymphatic tissue, both in the bowel wall and in the mesentery, which could be palpated at operation; enteritis would also cause abnormal irritative peristalsis and perhaps local spasm. It is suggested that, as a result of these factors, a mass of lymphatic tissue, possibly already at the apex of a plica, is pushed farther into the lumen of the intestine, which starts an invagination of the bowel wall; once started, further peristalsis would tend to increase the invagination, which forms the apex of the intussusception. Interference with the circulation leads to the characteristic "dimple" on reduction. Presumably also the dimple represents the site of the original spastic segment. This reasoning seems much more likely than the "caput-caeci" explanation, which postulates that the intussusception begins with the ileocecal valve as the apex, but that the fundus of the cecum gradually replaces it. In both cases here reported the condition was operated on early, and the initial invagination was undoubtedly haustrocecal, the appendix and ileocacal valve being drawn in secondarily and not themselves affected or obstructed.

The cecum normally enjoys a good deal of movement; it has been observed in the right inguinal canal and even occasionally in a left inguinal hernia. The presence of an ascending mesocolon, as was noted in both of these cases, would further help in the progress of the intussusception. Since my original case I have made a point of looking for an ascending mesocolon when removing an appendix and agree with Treves (1885) that it occurs roughly in 1 of every 4 cases.

COMMENT

When the patient in Case 1 was originally seen no mass was palpable, but there was some tenderness in the right iliac fossa, probably indicating that the invagination was forming. Some time later the invagination had progressed to intussusception which could be detected preoperatively by palpation. At operation the process had proceeded to the limit of the ascending mesocolon, where no doubt it was temporarily halted. The mass had the characteristic "sausage" shape, and the possibility of its being a small kidney was considered preoperatively. The curved shape of the mass and the curved route it takes are due to the tension of the mesentery, which is dragged into the outer sheath as the apex advances. This pull of the mesentery raises a ridge where it is attached to the intestine and produces a flat slitlike opening at the apex. As the apex advances, it acts as a foreign body and stimulates the outer sheath to contract, thus further compressing the mesentery and impairing the blood supply of the affected bowel. The extent of progress of

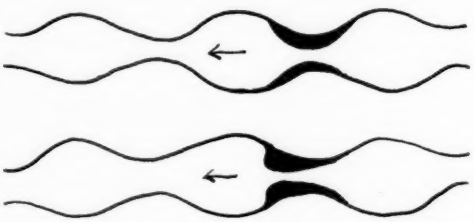
an intussusception may be quite surprising, carcinoma of the transverse colon has been seen sigmoidoscopically and I remember such a lesion in prolapse outside the anus.

In cases of subacute, and especially chronic, involvement the lesion is almost always reducible, and severe obstruction to the intestines and their blood supply does not occur so rapidly; however, if left, the condition may progress to complete acute obstruction.

In both cases here reported the severe colicky pain, with almost complete relief between attacks, is highly typical and is considered due to traction of the mesentery. This combination of colicky pain, diarrhea with blood and mucus, and increased peristaltic bowel sounds can be very confusing in tropical areas, where intestinal infections are so common.

Some authorities advise a barium enema in cases of suscepted intussusception to elucidate the diagnosis and also to determine the site. Typically a "coiled spring" pattern may be seen as the barium seeps between the layers of the obstruction, or else an obstruction at the apex of the invagination is detected. If the obstruction is in the adult colon, some are convinced that it should be regarded and treated as malignant; i.e., wide resection of the entire intussusception without reduction should be done after suitable preoperative preparation.

The cause of the diarrhea in the second postoperative week is obscure. It occurred in both cases and in the case previously reported. No sign of a pelvic abscess or other cause could be discovered in any of them, and examination of the stools in the latter 2 cases showed no pathogens present. One can only suggest that there is perhaps some metabolic or peristaltic cause by which the intestinal contents are hurried through to the exterior.



Figs. 1 and 2.—Segment of bowel goes into abnormal contraction or spasm while intestine below relaxes.

Fig. 3.—Spastic element tends to enter relaxed segment and be passed on as normal intestinal contents, thus forming start of an invagination.

Fig. 4.—Tumor attached to bowel wall starting an invagination.

RIASSUNTO

L'invaginazione di austra cecali, come causa di occlusione, è una evenienza così rara che merita di essere segnalata. Ne sono stati osservati due casi, in cui la flogosi della parete intestinale produsse un'alterazione della peristalsi che causò l'invasione del lume intestinale da parted: una massa di tessuto linfatico. L'azione della peristalsi, successivamente, trasformò l'invaginazione in intussuscezione.

RESUMEN

La intususpección causada por la invaginación de un anstro cecal es suficientemente rara como para justifical la publicación de dos casos. Se pensó que en los dos casos la inflamción de la pared intestinal produjo un peristaltismo desordenado que determinó la invajinación de una masa

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linfática dentro de la luz intestinal. La acción persistente del peristaltismo convierte la invaginación en intususpección.

SUMARIO

A invaginação retrocecal como causa de intussusepção parece ser suficientemente rara para garantir a comunicação de mais dois casos. Nesses casos pensou-se que a inflamação da parede intestinal foi devi da a u'a massa de tecido linfatico invaginado na luz intestinal. Uma posterior ação peristaltica converteu a invaginação em intussussepçõ.

RÉSUMÉ

L'invagination haustrocaecale comme cause d'intussusception semble être suffisamment rare pour just fier la description de deux cas supplémentaires. Dans ces deux cas il s'agissait d'une inflammation de la paroi intestinale ayant provoqué des troubles du péristaltisme à l'origine d'une invagination massive de tissu lymphatiqe de l'intestin. L'action péristaltique se poursuivant, l'invagination s'est transformée en intussusception.

ZUSAMMENFASSUNG

Die Einstülpung eines zökalen Haustrums als Ursache einer Intussuszeption scheint selten genug vorzukommen, um die Veröffentlichung zweier weiterer Fälle zu rechtfertigen. In diesen Fällen wurde angenommen, dass eine Entzündung der Darmwand eine gestörte Peristaltik hervorrief, die zu einer Einstülpung einer Masse lymphatischen Gewebes in die Darmhöhle führte. Weitere peristaltische Tätigkeit wandelte die Einstülpung in eine Intussuszeption um.

BIBLIOGRAPHY

Aldis, A. S.: Brit. M. J. 1:382, 1944.
Brayton, D., and Norris, W. J.: Am. J. Surg. 88:32, 1954.
Burke, M. S., and Williams, G. R.: Brit. M. J. 1:394, 1944.
Donhauser, J. L., and Kelly, E. C.: Am. J. Surg. 79:673, 1950.
Dunn, D. D., and Sherburn, E. W.: Surgery 26:833, 1949.
Hicks, A.: East Afrikan M. J. 30:155, 1953.
Kerr, W. G., and Kirkaldy-Willis, W. H.: Brit. M. J.: 1:799, 1946.
Levis, C. D.: Brit. M. J. 2:550, 1958.
McDermott, E. N.: Brit. M. J. 1:1214, 1935.
Parry, E.: Lancet 1:50, 1945.
Poston, R. I.: Brit. J. Surg. 22:108, 1934.
Treves, F.: The Anatomy of the Intestinal Canal and Peritoneum in Man, 1885.
Wardill, E.: Brit. J. Surg. 13:49, 1925.

The fifteenth-century physicians, hidebound by inflexible dogma, treated their patients by rule of thumb, forcing them to fit into the framework of their abstruse theories on medical practice. Today, the empirical methods, after careful examination by medical historians, appear to be more practical and effective than the accepted "official" medical system of the fifteenth century. The former was an artless and rudimentary therapy based on a pseudoscientific and popular medicine; the latter was a species of medical metaphysics in which the prevailing notions on body fluids and temperatures canceled the physician's intuition.

—*Marti-Ibañez*

Surgical Treatment of the Biliary Tract: Age as a Factor in Mortality

T. E. WADE, M.D.

LIBERAL, KANSAS

As age advances, the mortality rate associated with operation for gallstones becomes progressively higher, rising more and more rapidly with each decade of age.

The term "hazard index" is suggested to identify the number of years of life the average patient would probably lose by undergoing an operation for benign disease of the biliary tract. The index would be the product of the individual patient's life expectancy multiplied by the mortality rate for such an operation at any given age.

The damage inflicted by repeated attacks of cholecystitis is the logical basis for advising surgical treatment of symptomatic gallstone disease.

THE relatively high mortality rate associated with operation for gallstones in elderly patients, as compared with that of the same type of operation on the young, has been repeatedly observed.

De Champ and his co-workers[1] examined 468 patients with acute cholecystitis in which no deaths occurred among patients under 40 years of age. Among those from 40 to 60 the mortality rate was 5.5 per cent; among those over 60, 21 per cent. Freund[2] studied 140 cases of acute cholecystitis and stated that the mortality rate was 3 per cent for patients under 65 and 17 per cent for those beyond that age. Glenn[3] analyzed the records of 897 cases of acute cholecyctitis and recorded the mortality rate as 1.4 per cent for patients under 50 and 4.9 for those over 50. Glenn and Hays[4] reviewed 4,050 cases in which operations on the biliary tract were performed. They reported the mortality rates as follows: patients under 50, 0.65 per cent; 50 to 64, 2.5 per cent; patients over 64, 6.7 per cent. Large[5] reported 5 deaths among 125 patients; 4 of those who died were over 65 years old. Lyon[6] reported 134 cases of acute cholecystitis, with 10 deaths, 9 of which occurred among the 61 patients who were 60 or over. Meagher, and Campbell[7] reviewed 329 cases in which biliary operations were performed, recording the mortality rate as 1.4 per cent for patients under 60 and 10.1 per cent for those over that age. Snodgrass and his associates[8] reported 329 operations on the gallbladder. No deaths occurred among patients under 40; for patients age 41 to 60 the mortality rate was 3 per cent, and for those aged 61 to 80 it was 19 per cent. This obvious rise in mortality with advancing age seems worthy of further study.

Four reports of the results of surgical treatment of gallstone disease, totalling 1,982 cases, are found in which the incidence and mortality are reported by decades. Becker and his collaborators[9] reported 1,060 cases of acute cholecystitis. Two thirds of these were treated surgically.

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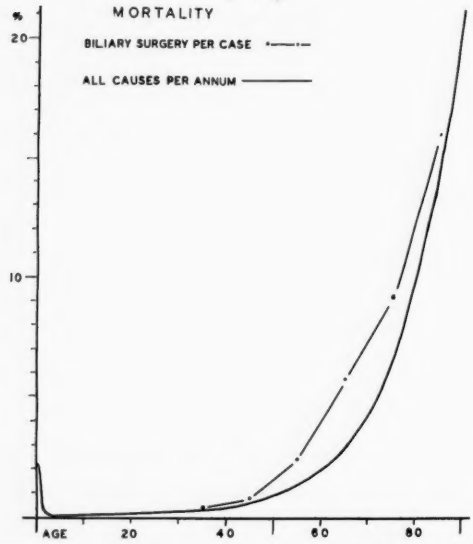
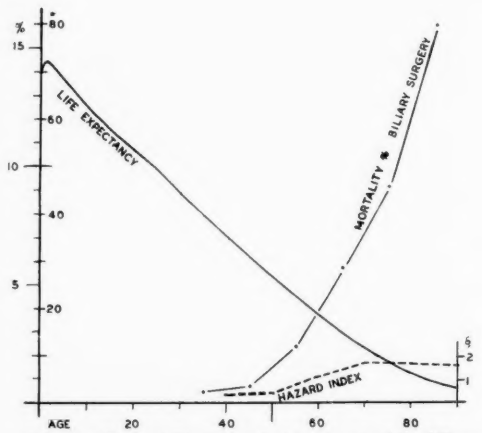


Chart 1.—Influence of age on mortality rate (see text).

Gaster[10] analyzed the records of 550 cases of all types of biliary surgical treatment. Lyon[6] reported 62 operations for acute cholecystitis in persons more than 60 years of age. Wade[11] analyzed the records of 310 cases of surgically treated benign biliary disease. The distribution of these cases and the mortality by decades is shown in the accompanying table.

In Chart 1, the influence of age upon the mortality rate associated with operations on the biliary tract is compared graphically with the annual death rate from all causes as revealed by the United States Life Tables.[12] Of every hundred persons living in each decade of life, a few will die from disease or injury each year. As age advances, a progressive loss of ability to withstand the assaults of disease and injury occurs. The mortality rate (deaths per hundred cases) of patients grouped by decades of age, requiring surgical intervention for disease of the biliary tract, is seen to rise in a more or less logarithmic curve as age advances. The similarity of the two curves suggests that the effect of age upon survival of disease of the biliary tract is comparable to the effects of age upon the patient's ability to recover from other diseases and injuries.

Comparison of mortality rate with life expectancy at various ages is pertinent. The term "hazard index" may be used to indicate the quantity of life with the loss of which a patient is threatened, and may be expressed as the product of the mortality rate multiplied by the life expect-



% Percentile mortality in surgical treatment of the biliary tract for persons of various ages.
* Years of female life expectancy in the United States.
§ Years of life lost by average patient with biliary disease requiring surgical treatment.

Chart 2.—Hazard index for persons in various age groups.

Age and Mortality Rates in 1,982 Cases

Age of patients	*0*	*10*	*20*	*30*	*40*	*50*	*60*	*70*	*80*	*90*	*100*
Cases	3	16	174	337	454	459	342	175	25	3	
Deaths				4	22	22	38	32	8	1	
Mortality, %				0.85	4.8	4.8	11.1	18.3	32	33	

ancy of persons of that age. For example, one may say that a 10 per cent chance of losing ten years of life is equal to a 1 per cent chance of losing a hundred years, or to a 4 per cent chance of losing twenty-five years. The hazard index for persons in various age groups is shown graphically in Chart 2. Note that persons in the fourth decade of life seem to risk about one-third of a year of life, while those in the eighth decade risk about one and three-fourths years. Thus, the risk of loss of life is not much greater to the elderly than to the young, as a hasty glance at Chart 2 may suggest. In this report, life expectancy for women at various ages was derived from the United States Life Tables,[12] and the mortality rates by decades were derived from the table presented in this study.

Disease of the gallbladder is considered a cause of eventual serious disability, yet little statistical information is available on the life expectancy of persons so afflicted. "A long term follow-up of insured lives with a history of gallbladder disorders indicated that such persons have a relatively favorable mortality, although somewhat (30 to 50 per cent) above the average for persons insured at standard rates."[13] The damage and injury that repeated attacks of cholecystitis inflict upon the liver and biliary system is the logical basis for advising surgical treatment of symptomatic gallstone disease. The greater safety of such surgical intervention in younger people is less significant.

It is hoped that these comments may provoke such interest that mortality rates by decades will be reported in many groups of cases, thus permitting observation of the curve of rising mortality associated with elective cholecystectomy and acute cholecystitis and resulting in a better appraisal of this trend of the hazard index. Who knows how many other diseases and/or operative procedures may reveal a similar trend?

SCHLUSSFOLGERUNG

Bei fortschreitendem Alter nimmt die Sterblichkeitsziffer bei Gallensteinoperationen zu, und zwar erfolgt der Anstieg mit grösserer Wucht von einem Jahrzehnt des Lebens zum anderen.

Zur Angabe der Lebensspanne, die der durchschnittliche Patient durch operative Behandlung einer gutartigen Erkrankung des Gallensystems wahrscheinlich einbüssen würde, wird die Bezeichnung "Risikoindex" vorgeschlagen. Diese Zahl ergibt sich aus der Multiplikation der voraussichtlichen Lebensdauer des individuellen Kranken mit der Sterblichkeitsziffer eines solchen Eingriffs in einem bestimmten Alter.

Der durch wiederholte Anfälle von Gallenblasenentzündung entstehende Schaden liefert die logische Grundlage zur Empfehlung chirurgischer Behandlung von Symptome hervorrufenden Gallensteinleiden.

CONCLUSIONI

Col progredire dell'etá aumenta la mortalitá operatoria negli interventi per calcolosa, e tale aumento diventa sempre maggiore di decade in decade.

Viene proposto il termine "indice di rischio" per indicare la durata media della vita che ogni malato rischia di perdere sottoponendosi ad un intervento per un'affezione benigna della via biliare. Questo valore si ottiene moltiplicando la sopravvivenza probabile di quel malato per la cifra di mortalitá relativa all'intervento.

Il danno conseguente ad attacchi ripetuti di colecistite é logicamente la base per indicare l'intervento chirurgico nella colelitiasi.

CONCLUSIONS

Le taux de mortalité des opérations pour calculs biliaires est proportionnel à l'âge

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des malades et augmente de plus en plus rapidement avec chaque décade d'âge.

Le terme d'"index de risque" est suggéré pour déterminer la période de vie dont peut être privé un malade par suite d'une opération pour affection bénigne des voies biliaires, et qui est le produit de la durée moyenne de vie prévue pour chaque cas individuel, multiplié par le taux de mortalité de l'opération à n'importe quel âge donné.

Les lésions résultant de crises répétées de cholécystite sont la base logique sur laquelle il faut s'appuyer pour conseiller le traitement chirurgical en cas de calculs biliaires symptomatiques.

CONCLUSAO

As taxas de mortalidade pós-colecistectomia por calculose vem aumentando muito e rapidamente em cada decada de vida. O termo "indice de sorte" é sugerido para identificar os termos médios de idade em que os pacientes provavelmente perderiam quando submetidos a operações nas vias biliares. Essa medida e o resultado do produto da expectativa de sobrevi da multiplicada pela taxa de mortalidade para uma determinaca operação num idade certa. A repetição de crises de colecistite indicam a intervenção cirurgica nos casos de calculose.

CONCLUSIONES

A medida que avanza la edad se hace progresivamente mayor el índice de mortalidad en las operaciones por litiasis biliar, aumentando más aún en cada nueva década de edad. Emplea el autor la expresión "índice de riesgo" (hazard index) para determinar la cantidad de vida que en un término medio de enfermos de vías biliares tienen probabilidad de perder al someterse a una operación para tratar su enfermedad. Esta cantidad es el producto de la vida probable de un enfermo por la cifrad de mortalidad que conlleva la operación para una edad determinada.

El mal acarreado por ataques repetidos de colecistitis es la base lógica para aconsejar el tratamiento quirúrgico del enfermo con sintomatologia gía de litiasis biliar.

REFERENCES

1. DeChamp, P. T.; Ochsner, A.; Baffes, T. G.; Bancroft, H., and Bendel, W.: Timing in Surgical Treatment of Acute Cholecystitis, Ann. Surg. **135**:734-750 (May) 1952.
2. Freund, H. R.: Acute Cholecystitis, Am. J. Surg. **82**:703 (Dec.) 1951.
3. Glenn, F.: Surgical Treatment of Acute Cholecystitis, Surg., Gynec. & Obst. **90**:643 (June) 1950.
4. Glenn, F., and Hays, D. F.: The Age Factor in Mortality Rate in Biliary Tract Surgery, Surg., Gynec. & Obst. **100**:11-18 (Jan.) 1955.
5. Large, A. M.: Problems in Surgery of the Gallbladder, Missouri Med. **51**:803 (Oct.) 1954.
6. Lyon, C. G.: Acute Cholecystitis in Elderly Patients, West. J. Surg. **61**:60-66 (Feb.) 1953.
7. Meagher, S. W., and Campbell, A. J. A.: A Review of 329 Cases of Acute and Chronic Cholecystitis, New England J. Med. **252**:615 (April 14) 1955.
8. Snodgrass, T. J.; Munn, W. A., and Flarity, T. H.: Surgery of the Gallbladder, Arch. Surg. **61**:199-210 (Aug.) 1950.
9. Becker, W. F.; Powel, J. L., and Turner, R. J.: A Clinical Study of 1060 Patients with Acute Cholecystitis, Surg., Gynec. & Obst. **104**:491-496 (April) 1957.
10. Gaster, J.: Surgery of the Biliary Tract, Arch. Surg. **60**:21 (Jan.) 1950.
11. Wade, T. E.: Surgery for Benign Biliary Tract Disease. Thesis submitted Nov. 13, 1956, to the Graduate School, College of Medical Evangelists.
12. United States Life Tables (1949-1951); Vital Statistics Special Reports. Washington, D.C.: U. S. Government Printing Office, 1951.
13. Society of Actuaries: 1951 Impairment Study, April 1954; cited in Statistical Bulletin of the Metropolitan Life Insurance Co. **36**:8-10 (Feb.) 1955.

Cardiovascular Surgery

Delayed Repair of Arterial Injuries

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HAIFA, ISRAEL

The authors report 6 cases of arterial injury of varying types, in which the interval between injury and repair also varied. Complete recovery took place in all.

Restoration of the continuity of normal circulation is the primary purpose of surgical treatment of a limb with an impaired blood supply. Regardless of the duration of delay in repair, the authors point out, the results of treatment may be highly gratifying.

THE surgical attitude to the problems of arterial injuries has altered considerably in the past seven or eight years. This change is due to the growing experience in the direct approach to various arterial pathologic conditions, as well as to the availability of grafting materials capable of bridging the largest gap in a diseased or injured artery. In the not-so-distant past the surgical approach to an arterial injury of the limbs was by ligation of the offending vessel to stop the hemorrhage. In the event of an ischemia developing in the organ distal to the ligature, amputation followed. Many indirect methods were introduced to save the tissues until a sufficient collateral circulation could be established. Among the most popular of the methods employed were sympathetic ganglion blocks, sympathectomy and cooling of the injured limb to reduce tissue metabolism; thus the most favorable result to be hoped for was a chronically suffering limb.

This passive and fatalistic approach is steadily changing. The reluctant attitude toward direct precise exploration of the arteries in the injured limb, when damage to a main vessel is suspected, should be a thing of the past. The immediate and late course of the injury may differ in each individual patient. Gangrene of the tissues distal to the injury is the severest consequence in cases of quick development.

From the Surgical Department, Rambam Government Hospital, Haifa.
Submitted for publication July 14, 1959.

On the other hand, with less severe injuries, repeated hemorrhages into the surrounding tissues may lead to the formation of a dense hematoma. The laminated clots may form a capsule and lead to the creation of a false aneurysm. True arterial aneurysms may also be formed. Ischemic phenomena develop below the aneurysms in both instances. An arteriovenous fistula may develop in the event of a concomitant injury to an adjacent vein, followed later by an arteriovenous aneurysm. The trophic changes usually observed are often accompanied by disablement of the limb distal to the point of injury. In addition, severe hemodynamic disturbances may result from the communication between large vessels.

A detailed description of 6 cases of

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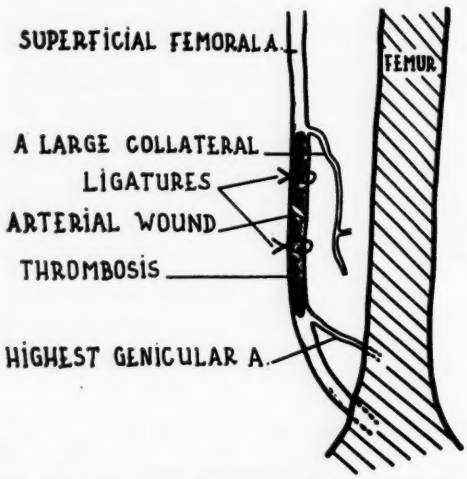

Fig. 1.—Diagrammatic representation of arterial injury and limits of extension of thrombus above and below injury.

arterial injury follows. Each case demonstrates a different facet of posttraumatic development when surgical repair was delayed from a short to a very long period (covering many years). In all these cases complete recovery was obtained after the injured vessels had been surgically repaired and continuity of arterial and venous blood flow restored.

REPORT OF CASES

CASE 1.—S. N., a 16-year-old boy, was admitted to the Rambam Hospital on Aug. 1, 1957, a short while after he had been stabbed with a knife in the right thigh. A profusely bleeding wound on the anterior surface of the thigh, apparently of venous origin, was discovered by the surgical resident. Two stitches were blindly passed deep into the wound, with the resultant stoppage of the hemorrhage. On the following morning the patient complained of pain and palsy in the right leg. On examination, a pale, cold limb without peripheral pulses was revealed. There was complete inability to perform voluntary movements with the foot and toes. Injury of the femoral artery with "ischemic paralysis" of the leg was the obvious diagnosis. The wound was surgically explored fifteen hours after first-aid ligature. A large incision disclosed that the two ligatures had passed around the femoral artery, with an oblique cut of 1 cm. in the arterial wall between the ligatures. The adjacent vein was intact. No immediate bleeding followed removal of the ligatures. The artery was then dissected free for a distance of about 7 cm. proximal and distal to the wound, and fresh thrombi were easily expressed from above and below the wound. A normal pulsating hemorrhage then appeared from both directions. The sharp oblique cut was repaired with a continuous running suture, of No. 5-0 silk. By the end of the operation, the leg had become warm and normal peripheral pulses were palpable. Three weeks after the operation the youth was discharged as fully recovered, with normal peripheral circulation.

Comment.—In this case an injured femoral artery was ligatured. Although severe ischemic phenomena appeared soon after injury, there was no time for gangrene formation, owing to the presence of collateral circulation. Restitution "ad integrum" was obtained in spite of the delay of fifteen hours between ligation of the main vessel and removal of the thrombus with repair of the wound. The thrombus, which formed below the distal suture, was prevented from rapid extension by the fairly good collateral blood flow through the highest genicular artery.

CASE 2.—A. R., a 20-year-old man, received a gunshot wound on Nov. 9, 1958, in the middle of the right thigh. No severe bleeding occurred, and débridement of the wound was performed, with slow healing by second intention. After the patient left the hospital intermittent claudication developed, with pains in the region of the calf after walking 400 meters. The pains increased in severity on climbing two flights of stairs. There was painful paresthesia of the toes. On April 26, 1959, the patient was admitted to the Rambam Hospital, where the following observations were made on examination. Fairly well palpable peripheral pulses were present below the gunshot wound, although weaker than on the uninjured side. Oscillometric tests over the scar in the thigh read 2.5 and in the calf 1 while on the other leg the readings were 6 and 3.5 over similar points.

Arteriographic study showed an interruption in the middle of the superficial femoral artery, with refilling, 10 cm. further on, of its distal part through collaterals.

Surgical exploration was carried out on March 5, and a complete transection of both retracted ends of the superficial femoral artery, with scar formation, was observed. A good pulsating flow of blood was obtained from both sides after resection of 2.5 cm. from both these ends and extraction of the remaining short obliterating thrombi. A freeze-dried arterial homograft 9.5 cm. long was inserted by end-to-end anastomosis, bridging the gap in the artery. Normal circulation was thus restored. Postoperative recovery was uneventful. The peripheral pulses in the injured leg became as strong as those in the other leg. The oscillometric readings were equal now in both legs. Paresthesia disappeared.

Comment.—The interesting features of this case are: 1. The spontaneous retraction, with immediate thrombosis of the two ends of the disrupted artery. 2. The extension of the thrombi only as far as the nearest good collateral branch, with persistence of fairly good peripheral pulses. The inconsistency of fairly good peripheral pulses with severe intermittent claudication may be explained by assuming that the collaterals were sufficient to preserve the pulses but unable to supply sufficient blood to the muscles during exercise.

CASE 3.—J. J., an 18-year-old youth, was wounded in both legs by the explosion of a hand grenade. Superficial soft tissue destruction was observed in the left leg, while on the other leg an open fracture, without severe bleeding, was present 10 cm. below the knee joint. The faintly palpable peripheral pulses were explained as due to mild shock. The wound was excised and closed. After reposition of the fracture the leg was placed in a plaster cast by the orthopedic surgeon. Thirty days later a hemorrhage stained the plaster cast, accompanied by a drop in blood pressure and hemoglobin level, the latter reaching a level of 8 Gm. per hundred cubic centimeters. The blood pressure returned to normal after an infusion of whole blood, but the hemoglobin level remained low. A second hemorrhage occurred several days later, with severe pains in

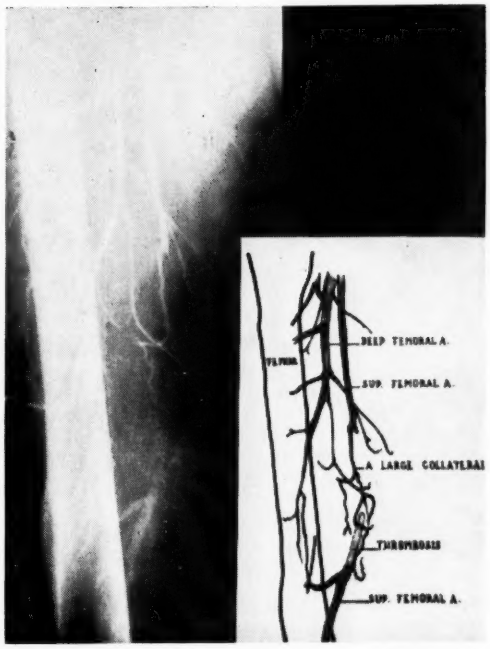

Fig. 2 *(Case 2).*—Arteriogram of superficial femoral artery, showing interruption in midthigh, with refilling of distal portion through collaterals.

the foot and leg. Removal of the cast revealed a small, open, bleeding gangrenous wound in the region of the sutures. A large, soft pulsating mass was seen to swell the calf. No peripheral pulses were palpable.

On July 29 operation was performed, with the patient under general anesthesia. The popliteal artery was reached by a posterior incision between the two heads of the gastrocnemius muscle. Dissection down the length of the artery disclosed a cavity filled by the débris of muscle and clotted blood, which was removed. The posterior tibial artery was closely adherent to the adjacent vein about 5 cm. below the bifurcation of the popliteal artery. Both vessels were somewhat enlarged. Pulsating blood flowed through a wound about 1 cm. long in the wall of the vein opposite the adhesion between the artery and the vein. Dissection of the vein from the artery revealed a communicating wound between them. The vein was then tied off above and below the wound. The posterior tibial artery, notwithstanding its narrow lumen, was repaired with a No. 5-0 silk running suture, a fair-

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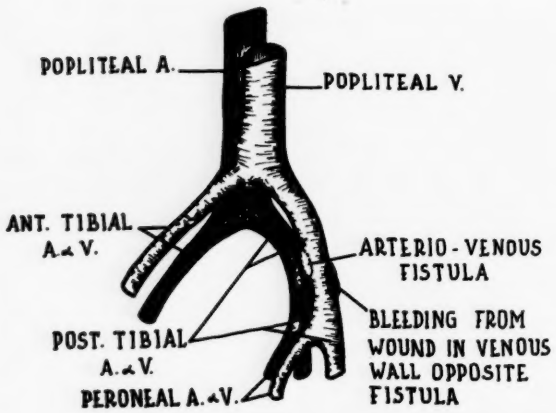
POPLITEAL A.
POPLITEAL V.
ANT. TIBIAL A. & V.
ARTERIO-VENOUS FISTULA
BLEEDING FROM WOUND IN VENOUS WALL OPPOSITE FISTULA
POST. TIBIAL A. & V.
PERONEAL A. & V.

Fig. 3 *(Case 3).*—Diagrammatic representation of injury to posterior tibial artery and vein, with profuse bleeding from artery through double perforation of vein.

sized lumen being left patent after the repair. Good strong pulsations proved the efficacy of the lumen after removal of the bulldog clamps. The posterior tibial and dorsalis pedis pulses were well palpable by the end of the operation. A plaster cast was then applied, and convalescence was progressive and uncomplicated.

Comment.—In this case an arteriovenous fistula was formed after perforation of the artery and vein by a fragment of the broken tibia. There was also a tear in the opposite wall of the vein, which had most probably been obliterated by the formation of a blood clot. It reopened subsequently, probably under pressure, with profuse bleeding into the surrounding tissue, forming a large pulsating hematoma. In spite of the narrowness of the injured vessel and the delay of thirty days between the injury and the repair, normal circulation was restored.

CASE 4.—I. L., a 28-year-old turner, was slightly wounded at work from a metal splinter in the anterior cubital fossa. There was profuse bleeding, and the only treatment rendered was the application of a pressure bandage. In the course of several weeks a small lump appeared in the region of the wound scar, which was not painful. It grew steadily larger, with gradual development of limitation of movement at the elbow joint. In six weeks the maximum extension of the elbow became limited to 120 degrees.

On admission to the Rambam Hospital (May 9, 1956), examination revealed the left arm, forearm and hand to be normal in shape, color and warmth. A small scar 2 cm. long was seen in the anterior cubital fossa, the whole area being elevated by a pulsating mass the size of a small plum. No radial pulse was palpable. Arteriographic study after injection of Urognost into the subclavian artery showed a saccular enlargement of the brachial artery in the elbow region, above its bifurcation. The obvious diagnosis was thus traumatic aneurysm of the brachial artery.

On September 13, with fractional plexus anesthesia, the region of the aneurysm was explored. Immediately above the bifurcation of the brachial artery a small pulsating mass was seen. The metal splinter lying close to it was removed. Further dissection showed that this mass was in fact a false saccular aneurysm measuring 3 by 2 cm. The wall was

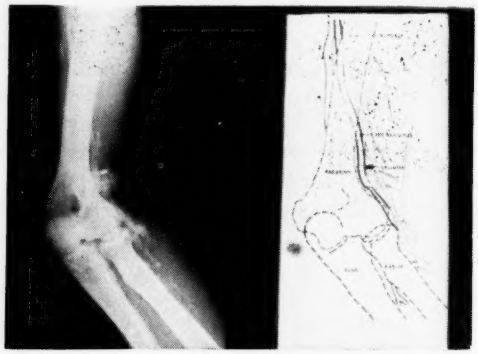

Fig. 4 *(Case 4).*—Arteriogram of the brachial artery, showing saccular enlargement in elbow region. Note enlarged collateral circulation.

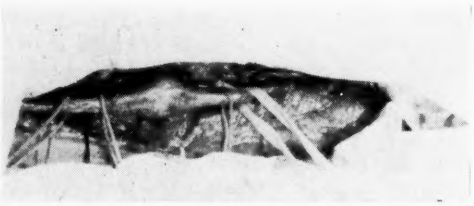

Fig. 5.—Photograph taken during operation, showing aneurysm on brachial artery.

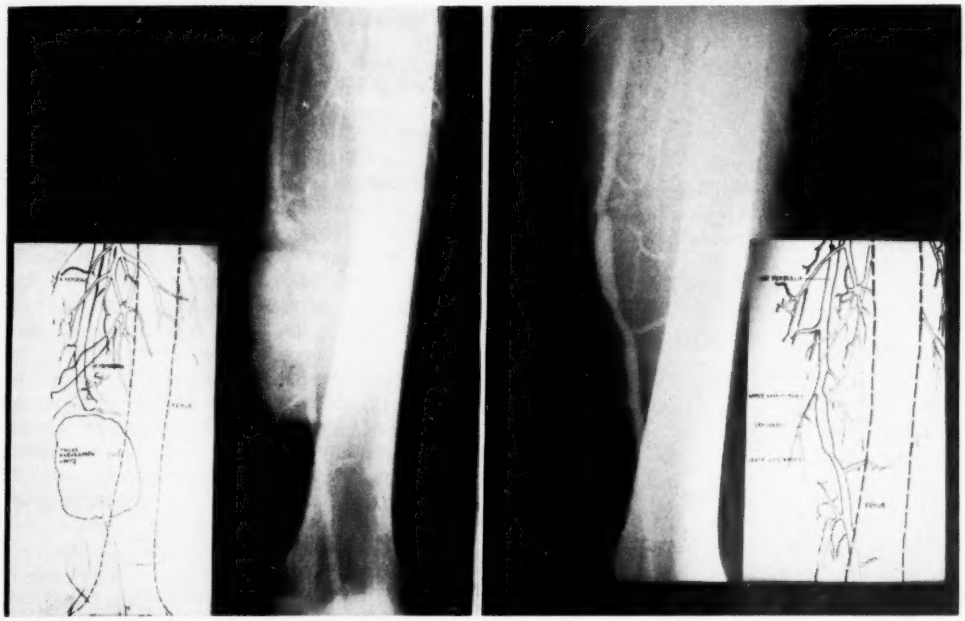

Fig. 6 *(Case 5).—A,* abrupt interruption of superficial femoral artery followed by aneurysmal mass and refilling of inferior part of femoral artery. Retrograde venous filling from aneurysm upward. *B,* arteriogram of femoral artery two months after operation showing normally functioning homograft.

formed by the dense transformation of laminated clots. The cavity communicated with the brachial artery through an opening 1 cm. long. After removal of the scar tissue the diagonal tear in the artery was sutured with a continuous over and over No. 5-0 silk thread. By the end of the operation the radial pulse had once again become palpable. Recovery was prompt and without any complications.

Comment.—Injury to the brachial artery caused a severe hemorrhage and hematoma in which a false aneurysm developed. The loss of pressure in the blood coursing through the aneurysm was responsible for the vanishing radial pulse. Full recovery occurred after excision of this false aneurysm and restoration of the continuity of the artery. Full mobility of the elbow joint returned after physiotherapy.

CASE 5.—A. M., a 19-year-old youth, sustained a bullet wound through the lower third of the right thigh on Nov. 6, 1958. According to the patient, the profuse bleeding was stopped by pressure bandages, the wound healing promptly. There remained a small pulsating swelling on the lower medial aspect of the thigh, which did not prevent his return to work.

One month later a sudden sharp pain occurred in the lower part of the right thigh, which then became swollen. There appeared simultaneous contracture of the knee joint, and the patient was unable to walk. On admission to the Rambam Hospital next day, a pulsating swelling in the lower half of the right thigh was observed. The knee was in painful contraction of 110 degrees. There were no peripheral pulses, and the oscillations measured showed values half those of the uninjured leg. On arteriographic study a large aneurysm from which retrograde venous filling was obtained, was seen to interrupt abruptly the course of the femoral artery in its distal third. Surgical exploration on Dec. 13, 1958, showed a small longitudinal tear measuring 1 cm. in the femoral vein and a lacerated wound 4 cm. long in the femoral artery, at the upper level of Hunter's canal. Both wounds

opened into a large cavity between the muscles, lined with laminated clots. The tear in the vein was easily repaired with a running silk suture. The lacerated portion of the femoral artery was excised and replaced by a freeze-dried arterial homograft 4.5 cm. long, with end-to-end anastomosis. The peripheral pulses became palpable by the end of the operation, and the knee could be easily straightened. Two weeks after the operation the patient was discharged, having recovered completely. Control examination two months after the operation showed normal circulation in the leg.

Comment.—The interesting feature of this case is the late repeated hemorrhages. Immediately after the injury the arterial and venous wounds had in all probability adhered by clotting, forming an arteriovenous fistula with a small pulsating hematoma around it. The damaged arterial wall disintegrated a month later, with the formation of a large hematoma between the muscles, and this caused a false aneurysm with contraction of the knee.

CASE 6.—V. K., a 52-year-old railway laborer, was seen in consultation at the Rambam Hospital on May 4, 1957, because of an intractable ulcer on the left leg. The past history significantly revealed that the patient had sustained a bullet wound in the upper portion of the right thigh some ten years earlier. The point of exit of the bullet was in the region of the fossa ovalis. In spite of the fact that the man had been in a serious condition, having spent two months in a hospital, the only treatment given was pressure bandaging. In the course of the past four years there had been a gradual increase in the size of the right leg. Several months before his admission to the Rambam Hospital the patient began complaining of pains in the right leg and the appearance of an ulcer, which became progressively worse despite treatment.

Physical examination revealed an enlarged and swollen right leg, with a calf greater in

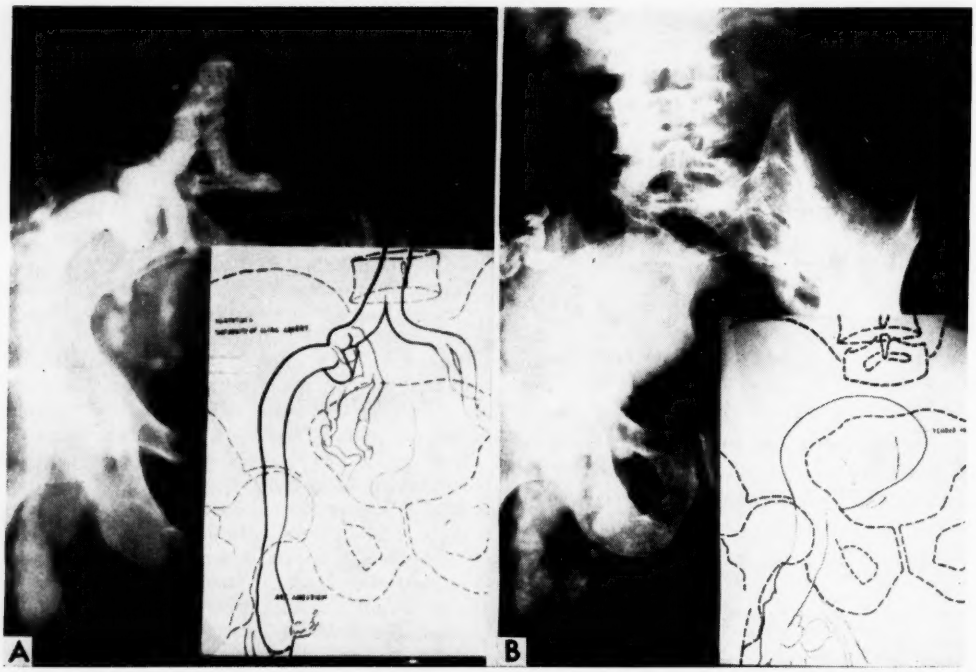

Fig. 7 *(Case 6).—A,* translumbar aortogram showing gross enlargement and tortuosity of right iliac artery and fusiform aneurysm of femoral artery in region of fossa ovalis. *B,* retrograde filling of large venous aneurysm of iliac vein from femoral aneurysm.

circumference by 12 cm. than that of the left leg. The swelling was hard and tense, with a superficial gangrenous ulcer 3 cm. in diameter on the lower part of the limb, just above the medial malleolus, and surrounded by thin, brown-pigmented atrophic skin. A strong pulse accompanied by a thrill was felt in the fossa ovalis. A soft pulsating mass 8 by 10 cm. was palpable in the right lower quadrant of the abdomen, immediately above Poupart's ligament. Pressure applied to the femoral artery below the ligament caused the tumor to disappear. On release of the pressure the mass reappeared. No peripheral pulses were palpable in the right leg.

Translumbar aortographic study revealed gross enlargement and tortuosity of the right iliac artery. In the region of the fossa ovalis a fusiform aneurysm of the femoral artery was observed. The roentgen ray showed simultaneous filling of the arterial and venous systems, as well as retrograde filling of a large venous aneurysm in the iliac vein.

On April 27, at operation, a longitudinal incision in the upper thigh revealed a pulsating fusiform aneurysm on the femoral artery below the profunda femoris. It was 7 cm. long and 3 cm. in diameter and had very thin walls. On the posterior aspect the aneurysm was closely adherent to the grossly enlarged femoral vein, which was comparatively wider than the aneurysm. Pressure on the femoral artery above the aneurysm brought about collapse of the vein and the disappearance of the pulsating mass above it in the lower part of the abdomen. The arterial aneurysm was excised, a narrow raised ledge clearly left around the arteriovenous opening, which measured 2.5 by 0.5 cm. This was then closed with a No. 5-0 running silk suture through the prepared ledge; this restored normal venous circulation. A freeze-dried arterial homograft 7 cm. long was inserted in an end-to-end anastomosis between the cut edges of the femoral artery, leaving a fully restored femoral artery circulation, with good strong pulsations along its length.

Several hours after the end of the operation the peripheral pulses could be weakly palpated. By the second postoperative day they had returned to normal. The ulcer on the leg rapidly healed, and the hard edema gradually regressed. By the end of a month the size of the leg had returned to normal and the abdominal venous aneurysm had spontaneously vanished,

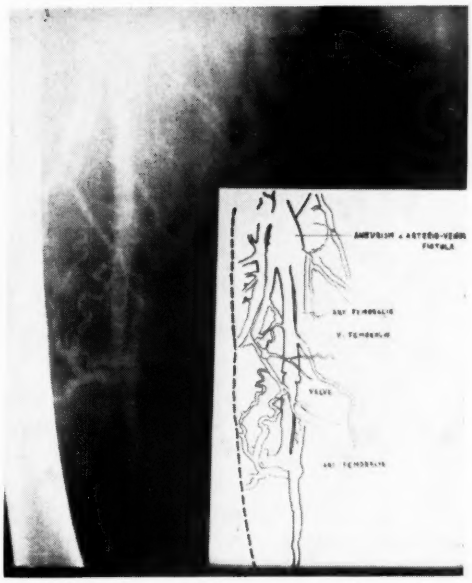

Fig. 8 *(Case 6).*—Filling of femoral vein from aneurysm downward.

causing no further complications. There was no indication for surgical treatment here.

At the time of writing, some six months after the operation, the patient is back at his normal occupation without any limitations or restrictions and with normal peripheral pulses. The brown pigmentation is the only sequela.

Comment.—In this case a large femoral arteriovenous fistula with a huge retrograde venous aneurysm slowly developed after traumatic injury. Lack of peripheral pulses can be explained by the large arteriovenous shunting of blood. The deficiency within the arterial system and the raised pressure in the venous system brought about the severe trophic changes observed in the leg. This disturbed state of hemodynamics had not as yet expressed itself in any other clinical form, probably owing to the "cushioning" of the high arterial pressure by the large venous aneurysm. The electrocardiogram was entirely normal.

Notwithstanding the delay of ten years, the peripheral pulses returned with the restoration of normal circulation, and the

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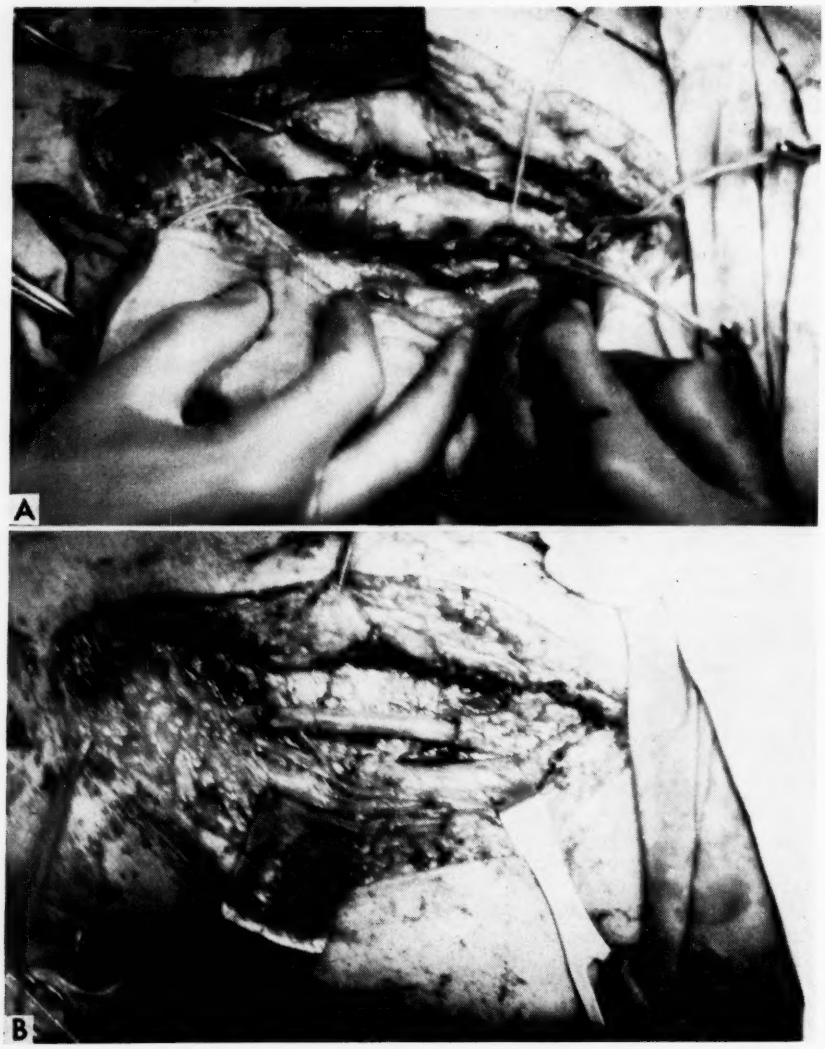

Fig. 9 *(Case 6).—A*, photograph taken at operation, showing femoral aneurysm with vein lying behind it. Note great enlargement of vein above aneurysm and narrowness of vein below. *B*, photograph taken at end of operation, showing homograft in place. Vein separated from graft by interposed femoral fascial flap.

large, hard and long-standing edema was completely resorbed, transforming an invalid into a healthy person.

GENERAL COMMENT

The foregoing cases show that repair of an injured artery, even when greatly delayed, can bring about complete functional and even cosmetic return to normal. In treating an arterial injury the guiding principles should be, first, that not too much reliance should be placed on collateral circulation; second, that a main artery should never be tied off until the pos-

sibility of restoration of continuity by direct suture or by grafting has been ascertained. Arteries with narrow lumens, e.g., the brachial and posterior tibial arteries, can be repaired and so provide and maintain an adequate blood supply. This holds true in most cases of injury, since most of the injured are young persons with normally elastic arteries.

The preservation of a main artery is of primary importance.

A sufficient amount of blood flowing at the required pressure cannot be supplied by collateral circulation. Collaterals can save a limb from immediate gangrene, as in Case 1, and thus make for the success of the delayed operation. Collaterals can even preserve fairly good peripheral pulses, as in Case 2, but they cannot supply adequate blood for work requirements of the muscles, and therefore intermittent claudication appears. The femoral artery beneath the site of the injury was filled in both cases by thrombi reaching as high as the first good collateral branch. It was possible at operation to express the thrombi and reopen the lumen of the artery.

The type of injury and the duration of delay before correction is undertaken present different problems. In the event of a short delay of some hours, when the collateral circulation has preserved the tissues, the main problem is the restitution of continuity of the injured vessel. The open lumen must be found on either side of the injury, so that, after removal of the thrombus, direct suture or an arterial grafting can be performed. When the injuries are of long duration or complicated and possibly involve both artery and vein, trophic and functional changes may be observed. The question is whether restoration of normal circulation can bring about the reversal of these crippling injuries. Case 6 shows, in point of fact, that even after a lapse of many years a painful, swollen and ulcerated leg can be restored to normal size, form and function.

It has thus been shown that every case presents its own individual problems demanding the surgeon's skill and powers of improvisation in order to deal with its special kind of injury. Careful dissection, preservation of all collaterals, precise anastomosis and very delicate suturing, especially in vessels of small caliber, are the prerequisites to success.

SUMMARY

Six cases of arterial injury are presented. The kind and form of the injury differs in each case, as does the period of delay between injury and repair.

Direct repair was possible in 3 of the cases, in which the delay was fifteen hours, one month and three months respectively. In Case 1 there was a stab wound in the femoral artery. In Case 3 an arterio-

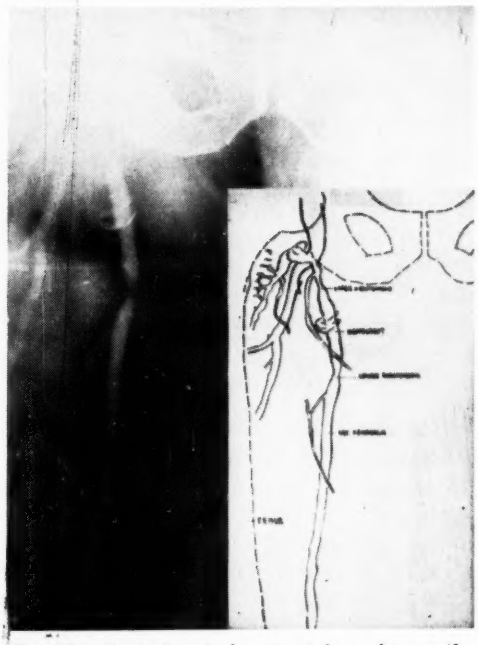

Fig. 10.—Control arteriogram taken six months after operation, showing normally functioning homograft.

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venous fistula was present, caused by a splinter of bone from an open fracture, with repeated hemorrhage through a wound in the vein adjacent to the artery. In Case 4 a false aneurysm, caused by a metal splinter, formed in the brachial artery. The aneurysm was excised and the opening in the artery closed by direct suture.

In 3 cases repair was achieved by homografting. In Case 2 the cut ends of the femoral artery retracted and serious intermittent claudication developed, and was restored to normal by a freeze-dried homograft. In Case 5 there was an arteriovenous fistula of a month's standing, caused by a bullet wound; this was repaired by suture of the damaged femoral vein and insertion of a homograft between the torn ends of the femoral artery. In Case 6 a bullet wound in the thigh had been received ten years before repair was undertaken. A large arteriovenous aneurysm had formed, with severe trophic changes in the leg. Repair was accomplished by excision of the aneurysm and replacement by a freeze-dried homograft.

Complete recovery took place in all 6 cases.

Restoration of continuity of normal circulation is thus the primary purpose of the surgical treatment of an injured limb with an impaired blood supply. Regardless of the period of delay in repair, the results may be most gratifying.

ZUSAMMENFASSUNG

Es wird über sechs Fälle von Schlagaderverletzung berichtet. Die Art und Weise der Verletzung sowie die Zeitspanne zwischen dem Unfall und der Wiederherstellung sind in allen Fällen verschieden.

Eine direkte Wiederherstellung war in drei Fällen möglich, bei denen 15 Stunden, bzw. ein oder drei Monate zwischen der Verletzung und der Operation verstrichen waren. Im Fall 1 bestand eine Stichwunde der Oberschenkelschlagader. Im Fall 3 lag eine arteriovenöse Fistel vor, die durch einen Knochensplitter von einem offenen Bruch hervorgerufen und mit wiederholten Blutungen aus einer Wunde der der Arterie anliegenden Vene verbunden war. Im Fall 4 hatte sich durch einen Metallsplitter ein falsches Aneurysma der Brachialarterie gebildet. Das Aneurysma wurde herausgeschnitten und die Öffnung in der Schlagader durch direkte Naht geschlossen.

In drei Fällen erfolgte die Wiederherstellung durch Homoplastik. Im Fall 2 hatten sich die durchschnittenen Enden der Oberschenkelschlagader zurückgezogen, was zu schwerem intermittierenden Hinken führte. Die Verletzung wurde zur Norm wiederhergestellt durch Einsetzung eines durch Frierung und Trocknung konservierten menschlichen Transplantats. Im Fall 5 lag eine durch Schussverletzung entstandene einen Monat alte arteriovenöse Fistel vor. Die Wiederherstellung erfolgte durch Naht der beschädigten Oberschenkelvene und Einsetzung eines menschlichen Transplantats zwischen die zerrissenen Enden der Oberschenkelschlagader. Im Fall 6 bestand eine zehn Jahre vorher erfolgte Schussverletzung des Oberschenkels, als an die Wiederherstellung herangegangen wurde. Es hatte sich ein grosses arteriovenöses Aneurysma mit schweren trophischen Veränderungen des Beines gebildet. Die Wiederherstellung gelang durch Ausschneidung des Aneurysma und Einsetzung eines gefrorenen und getrockneten menschlichen Transplantats.

In allen sechs Fällen trat völlige Heilung ein.

Das hauptsächliche Ziel chirurgischer Behandlung einer Gliedmassenverletzung mit behindertem Blutzufluss liegt also in der Wiederherstellung der Kontinuität eines normalen Blutkreislaufs. Die Erfolge können ungeachtet der seit der Verletzung verstrichenen Zeitspanne höchst befriedigend sein.

RIASSUNTO

Vengono presentati sei casi di lesione arteriosa, di differente specie e gravità, trattati a distanza varia dal momento del trauma.

La cura diretta fu possibile in tre casi, rispettivamente a 15 ore, un mese e tre mesi dalla lesione. Nel primo caso di trattava di una lesione da punta della femorale, nel terzo vi era una fistola arterovenosa, causata da una scheggia ossea, con emorragia profusa; nel quarto vi era un aneurisma falso, dovuto a una stecca metallica, a carico dell'arteria brachiale, che fu resecato.

Nel terzo caso si procedette ad un omotrapianto; nel secondo, in cui i due capi dell'arteria sezionata si erano retratti, causando gravi disturbi ischemici, la continuità fu ristabilita mediante un omotrapianto secco congelato; nel quinto vi era una fistola arterovenosa datante da lungo tempo, causata da un proiettile: la lesione venosa venne richiusa mediante sutura e quella arteriosa mediante la inserzione di un omotrapianto fra i due capi lacerati; nel sesto caso vi era stata una ferita della coscia da proiettile 9 anni prima: si era formato un grande aneurisma arterovenoso, accompagnato da notevoli disturbi trofici dell'arto: venne trattato mediante escisione dell'aneurisma e trapianto omoplastico congelato.

In tutti i 6 casi si ottenne una perfetta guarigione.

Il ripristino della circolazione normale è pertanto lo scopo principale da raggiungere nella cura chirurgica delle lesioni degli arti accompagnate da disturbi vascolari. I risultati possono essere eccellenti, indipendentemente dalla lunghezza del periodo intercorso fra la lesione e la cura.

RÉSUMÉ

Six cas de lésions artérielles sont décrits. La nature et la forme de ces lésions sont différentes dans chaque cas, de même que le temps écoulé jusqu'à la réparation.

La réparation directe a été possible dans trois cas après des délais respectifs de 15 h., un mois et trois mois. Cas No. 1: coup d'estoc dans l'artère fémorale; cas No. 3: fistule artérioveineuse causée par une arête osseuse à la suite d'une fracture ouverte, avec hémorragies répétées à travers une plaie de la veine adjacente à l'artère. Cas No. 4: faux anévrisme provoqué par un éclat métallique, dans l'artère humérale; excision de l'anévrisme et suture artérielle directe.

Dans trois cas, réparation par greffe homoeoplastique. Dans le cas No. 2: rétraction des extrémités de l'artère fémorale sectionnées avec forte claudication intermittente; retour à l'état physiologique par homoeogreffe congelée-séchée. Cas No. 5: fistule artérioveineuse detant d'un mois par suite d'une plaie par balle; réparation par suture de la veine fémorale lésée et insertion d'une homoeogreffe entre les extrémités arrachées de l'artère fémorale. Cas No. 6: plaie à la cuisse dix ans auparavant, par arme à feu; il s'était formé un gros anévrisme artérioveineux avec troubles trophiques graves de la jambe. Réparation par excision de l'anévrisme et homoeogreffe congelée-séchée.

La guérison a été totale dans les six cas.

La restauration de la continuité circulatoire est le premier objectif du traitement chirurgical d'un membre blessé avec atteinte circulatoire. Sans égard au temps écoulé entre la lésion et sa réparation les résultats peuvent être des plus satisfaisants.

SUMARIO

Apresentam seis casos de lesão arterial, de forma e naturesa diversas, assim como o prazo entre a lesão e o tratamento. O socorro imediato foi possivel em 3 casos com retardo de 15 horas, um mês e tres meses, respectivamente. No caso I houve uma ferida por faca na femural. No caso

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III havia uma fistula arteriovenosa causada por fragmento de fratura com hemorragia repetida. No caso IV um falso aneurisma na arteria braquial. Excisão do aneurisma e sutura direta da arteria.

Em 3 casos foram feitos homoenxertos. No caso 2 em que o cabo arterial seccionado retraira houve grave claudicação intermitente e o tratamento foi homeenxerto congelado seco. No caso 5 havia uma fistula arteriovenosa ha um mes causada por ferimento de bala; o tratamento foi sutura venosa e homo-enxérto em torno da arteria femural. No caso 6 havia um ferimento de bala há 10 anos com um grande aneurisma arteriovenoso e graves modificações troficas da perna. A reparação foi feita por excisão do aneurisma e enxêrto homogene congelado seco.

Houve recuperação completa nos seis casos. O restabelecimento da continuidade normal é o objetivo primario do tratamento cirúrgico do membro com suprimento sanguineo anômalo. Os resultados podem ser muito bons independentemente do retardo do tratamento.

RESUMEN

Se presentan en este trabajo 6 casos de lesión arterial; son diferentes la clase y la forma de la lesión, así como el tiempo transcurrido en el tratamiento. Fué posible la reparación directa en 3 casos después de 15 horas, un mes y 3 meses respectivamente. El caso primero se trataba de una herida de arma blanca en la arteria femoral. En el caso tercero había una fístula arterio-venosa producida por una esquirla en una fractura abierta con hemorragias repetidas a través de la herida desde la vena adiacente a la arteria.

En el caso 4º se trataba de un falso aneurisma por una rebarba metálica en la arteria humeral. En este último caso se extirpó el aneurisma y la herida arterial se cerró con sutura directa.

3 casos fueron tratados con homoinjerto; el caso no. 2 de sección de la femoral con los cabos retraídos y claudicación intermitente importante se trató con un homoinjerto congelado en seco. El 5º caso correspondía a una fístula arteriovenosa desde hacía un mes causada por una herida deb bala; este caso fué tratado con una sutura de lavena y con un homoinjerto entre los extremos arteriales. El caso 6 era un proceso arterial consecutivo a una herida de baja en el muslo ocurrida lo años antes. Se había formado un gran aneurisma arteriovenoso con graves alteraciones tróficas en la pierna. Se extirpó el aneurisma y se implantó un injerto congelado en seco.

En los 6 casos la recuperación fué completa. En todos los casos de lesiones arteriales de los miembros que afectan a la circulación la indicación fundamental es la reconstrucción de la corriente sanguínea. Los resultados pueden ser de lo más satisfactorios independientemente del tiempo transcurrido.

BIBLIOGRAPHY

Cole, W. H., and Elkin, D. C.: Operative Technic. Appleton-Century-Croft, Inc.

De Bakey, M. E., and Simeone, F. A.: Am. Surgeon **123**:534, 1946.

Hughes, C. W.: Surg., Gynec. & Obst. **99**:91, 1954. Am. Surgeon **141**:297, 1955.

Miller, H. H., and Welch, C. S.: Am. Surgeon **130**:428, 1949.

Seelay, S. F.; Hughes, C. W.; Cooke, F. N., and Elkin, D. C.: Am. J. Surg. **83**:471, 1952.

Hughes, C. W., and Jahuke, E. J. Jr.: Ann. Surg. **148**:790, 1958.

A New Era in the Treatment of Coronary Insufficiency

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Medical treatment alone is not lowering the mortality rate of coronary insufficiency, which is rapidly becoming the foremost hazard to human life in its most productive years. The disease is both medical and surgical, and a combined effort is required to combat it.

The author points out that surgical revascularization of the myocardium has proved safe and beneficial and that its wider use would doubtless reduce the appalling mortality rate associated with coronary disease. For this purpose hypothermia, together with various forms of medical care, has certain advantages. Stress is laid on the vital importance of preserving life and function up to the Biblical limit of "threescore and ten" whenever possible; after that age surgical therapy must be employed with great caution, lest the aged patient sustain iatrogenic injuries worse than the original disease.

CORONARY sclerosis and thrombosis cause coronary insufficiency, which leads to anoxia of the heart muscle. "Checkerboard" or uneven distribution of blood results in anoxia and fibrillation of the involved ventricle, a condition followed rapidly by death. This deficiency in blood supply accounts for one-third of all deaths among middle-aged North American men; moreover, the incidence is increasing annually. The economic loss in this most productive age group is of national importance.

In recent years there is evidence that the exclusively medical treatment of coronary disease is not the answer to this grave problem. The mortality rate has not been decreased by present-day medical care. It is questionable even whether life has been prolonged or suffering relieved thereby. One must take into careful consideration the complications arising from temporary vascular dilatation and the anticoagulation routine measures employed. The treatment of coronary insufficiency may be medical, surgical or a combination of the two. Each case must be treated on the basis of the individual pathologic picture, as no one treatment can serve all types. The pride or prejudice of the attendant must be subordinated to the ultimate good of the patient, with full cooperation and mutual understanding. Fears and obsessions of the patient must be banished, and a psychiatrist should be called in before and after treatment is carried out.

The fate of the myocardium and indeed the fate of the patient depend upon the available blood supply to the ischemic area at the time of the catastrophic obstruction of the coronary artery or its branches. Coronary heart disease is a grim battle for survival, between the relentless occlusive process on the one

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hand and a compensating collateral circulation on the other. The victim is in an extremely precarious stage of his life.

That nature attempts to revascularize the ischemic area is made evident by pericardial adhesions with the formation of new vessels after such blockage and enlargement of the sinusoids and intersinus channels of the myocardium. Unfortunately for the heart, time may be limited and nature does not fulfil its needs.

If nature has been unable to meet the demands of today's unnatural requirements and is unable to give the heart the required blood supply through the changing coronary system; if physicians are unable to help except by temporarily dilating all vessels and attempting to prevent clotting, then there is good reason for carrying out other methods which, given a good trial over many years, have proved valuable in carefully selected cases of coronary insufficiency.

The available blood supply and the demand are frequently dependent upon the alertness and the physiopathologic knowledge of the attendant physician who is called upon to treat the unfortunate candidate with coronary disease.

It is a fact long since proved that a flow of only 5 cc. of blood per minute through the coronary arteries is sufficient to prevent an ischemic change and therefore to eliminate the signs and dangers of acute coronary infarction leading to anoxia, fibrillation and cardiac arrest. Only because of the presence of an accessory vascular supply to the heart muscle can these conditions be averted in a high percentage of cases.

The supply of blood to the myocardium may be controlled somewhat by the use of vasodilators, sedatives, increased oxygen intake or anticoagulants, with all their inherent dangers. Many weak points and complications show up in this mode of treatment alone. Medical treatment fails to produce the most essential requirement, namely, revascularization of the ischemic area or preparation of a satisfactory emergency measure in the event of further coronary infarction. It is essential to life that there is at all times a sufficient blood flow to all parts of the myocardium to insure normal function.

There is need of a review, conducted locally and nationally, and a more energetic effort toward prevention, early diagnosis and treatment of a kind that will benefit the patient and lower the mortality rate of coronary insufficiency and infarction. Too many comparatively young men are dying from an otherwise frequently preventable cause. In no field of circulation have professional views changed more frequently than in the interpretation of the coronary circulation.

Coronary disease is progressive. At present there is no proof that the pathologic nature of the disease can be changed, as there are so many factors associated therewith. An effort must be made, at least, to meet the problem in each individual case. The very makeup of the human being does not allow for mass treatment: as no two persons look alike, so do no two have the same reaction to treatment.

The hallmarks of focal ischemic necrosis of the myocardium are increasing fatigue on exertion, retrosternal compression and angina of effort with its varying sites of transmission. Frequently the electrocardiogram and the serum glutamic oxalacetic transaminase and blood cholesterol levels reveal no abnormality. A most careful and unhurried appraisal should be made of all patients with the aforementioned symptoms and the case frequently reviewed before they are given a clear bill of health. All too often the superficial indications are deceptive; the patient may state that he "never felt better in his life"

and still be found dead just around the corner from the doctor's office!

The heart cannot depend upon temporary dilatation forced by medications, the exact consistency of which cannot be known for the manufacture and dosage of drugs are by no means exact sciences; they involve many variables. The psychic of ingestion and injection of medicines is indeed amazing and an easy method of hypnosis.

After long use of vasodilators, such as nitroglycerine, there is irreversible dilatation, and slowing of the blood stream occurs, owing to the widened lumen. There are changes in the vasa vasorum, the elastic and muscle fibers and the neural and lymphatic constituents of the vascular system that actually increase the mechanical factors producing thrombosis and insufficiency, with the ever-present danger of massive infarction and death.

The basic action of nitroglycerine, or any other agent that acts as a pure vasodilator, does not alter the metabolism of the organ under study. If flow to the organ is increased through lowering of the regional vascular resistance, then oxygen extraction and carbon dioxide removal per milliliter of blood are correspondingly decreased. Hydralazin, for example, increases the flow for a short time, but oxygen extraction decreases, as evidenced by an increased coronary venous oxygen content and an unaltered cardiac oxygen consumption.[1]

Many prescribed medicines and routine orders and advice to the patient by the doctor are soon forgotten; the patient does not follow them, takes too much or too little, or does not even commence the treatment prescribed. It must be remembered that all prescriptions are not taken to the pharmacist, many patients avoiding the pharmacy because of the unbearable expense.

It should be remembered also that the majority of persons who have coronary disease have had their symptoms long before consulting a physician. Their "indigestion" and "gas in the stomach" have actually troubled them for years, and they have sought relief in home remedies and palliative patent medicines. As with so many other ills of mankind, the victim seeks professional help only when the symptoms, especially pain, become alarming. It is generally "much later than we think" in the vast majority of instances. For better medical and surgical judgment in treatment it is often wiser, in cases of malignant and degenerative lesions, to double or triple the time duration of symptoms given by the patient and expect the pathologic change or spread of the lesion to be tenfold. There will then be few unexpected discoveries and perhaps fewer delays in deciding on an accurate diagnosis and corrective treatment.

All the advice in the world about diets, physical and mental stress and medication are of little avail to the patient with coronary disease, unless he is lowered to a status of a cardiac cripple. It should be recalled that the majority of acute episodes and infarctions take place while the patient is at rest, when the circulation is slowed and the blood pressure lowered.

Only recently has there been universal recognition by internists of the fact that pressor drugs have reduced the hitherto astronomic mortality rate of coronary infarction only and to an insignificant extent. Yet for many years surgical intervention has been widely employed to treat similar conditions elsewhere in the body. As examples one may cite revascularization of nonhealing ulcers by skin grafts or excision of the fibrous nonvascularized edges; replacement of arteries or by-passing obstructed limb vessels; operation for peptic ulcers, and the approximation of healthy tissue to less vascular tissue. All

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these treatments are based on the knowledge that if two tissues are approximated with abraded surfaces or an irritant between, new vessels are always formed and blood passes to the side that needs it most. Nature will do wonders if given a little help. Since these principles are universally accepted, why does not the profession accept a similar process—revascularization of the myocardium by means of safe surgical procedures?

In the field of cardiovalvular surgery and cardiac surgery in general, progress was held up for twenty-five years because of the teaching of a single physician "authority." In 1925 Mr. Souttar, a London surgeon, dared (!) to perform a mitral commissurotomy for mitral stenosis. After this pioneer triumph Sir James McKenzie so strongly denounced this "interference" with the physicians' "sacred" organ that a quarter of a century passed before physicians commenced thinking logically for themselves and saw the benefit of such a physiologic procedure. In a similar tone the same "giant" of our profession denounced any effort to restore vascularization of a diseased heart muscle in cases of coronary insufficiency or infarction.

It appears that there are some who obstinately refuse to acknowledge the advances already made to the benefit of the patient with coronary insufficiency—advances attributable to such pioneer cardiac surgeons as O'Shaughnessy, Beck, Mason and Vineberg. Motivated by pride, prejudice or lack of personal experience in laboratory research, the nonbelievers and obstructionists are displaying the mentality of the opponents of Semmelweiss, Pasteur, Lister and Fleming in their reluctance to accept sound and proved discoveries. Disregarding the obvious truth, they continue to treat their patients by trial and error, with the same mortality rate year in and year out.

"The heart is the toughest, strongest, most persistent and tenacious organ and carries on and adapts itself against almost any odds, often for a time without support of other organs." In spite of this marvelous mechanism, as Dr. Gordon Murray has described it, the heart requires blood with oxygen in order to function. It takes but a few cubic centimeters of blood per minute, supplied for this purpose to overcome an ischemic process. These few cubic centimeters prevent anoxia, the prevention of which in turn prevents fibrillation and death. "Anoxia not only stops the machine but wrecks the machinery."

Heart failure from coronary disease is due to the inability of the heart to satisfy the metabolic requirements of the body, and this is caused by blockage that keeps a few red blood cells from reaching deprived areas in the heart muscle. Any change in cardiac metabolism leads also to a change in the biochemical content of the heart and therefore a decrease in its efficiency.

All cases of fatal coronary disease terminate in ventricular fibrillation unless the latter is overcome by defibrillation, the giving of oxygen and cardiac massage; otherwise, death is the result. With an accessory blood supply many of these bad features are more readily overcome or prevented in a case of major blockage of the coronary arteries.

The metabolic factors relevant to cardiac function are as follows: blood sugar, lipoproteins, pyruvic acid, lactacidemia, kalemia, chloremia, sodium, potassium, serum glutamic oxalacetic transaminase and cholesterol.

The pathologic hallmarks of coronary insufficiency are patchy focal necrosis and scarring of the endothelium or the papillary muscles of the ventricle or its septum. Any factor that increases cardiac work in the presence of diseased arteries

decreases coronary flow or alters the oxygen-carrying capacity, which in turn leads to anoxia.

Etiologic Factors in Coronary Insufficiency.—There are many causes that lead to change and insufficiency of the coronary arteries and therefore inefficiency of the cardiac muscle. In addition to the inherent factors, there may be an increase in lipoproteins or in sugar; overactivity of the adrenal glands; emotional states; excessive physical or mental exertion; poisons (e.g., nicotine); severe infections; aortic and mitral lesions, or compression of the heart (coronaries) in the presence of pectus excavatum or a large hiatus hernia. Any of these lesions may be a factor in causing coronary insufficiency. According to Sir William Osler, "Coronary disease is the nemesis through which nature exacts retributive justice for the transgression of her laws." Diet, alcohol and tobacco are the greatest offenders.

Treatment of Coronary Insufficiency.—The emergency treatment of acute coronary insufficiency is of immense importance and should take precedence over all other emergencies, because of the extreme danger to life and the many unknown factors present. All necessary equipment and "brains" should be concentrated in a separate or special ward or unit of each hospital. All patients with coronary disease should be sent *direct* to this coronary unit and given immediate attention by a well-trained personnel. If there are similar units for ophthalmologic, orthopedic and other emergencies, why should there not be one for so important an emergency as coronary insufficiency that requires hospitalization?

The important aim is to reduce the high mortality rate. Teamwork, both medical and surgical, should come into play even though a number of patients may be restored by current medical treatment alone.

In this "coronary unit" of two emergency treatment rooms and a required number of ward beds, there is an available intern and a nurse well trained in cardiac emergencies. Should the attending physician or another not be immediately available, life-saving measures may be instituted.

The following medications and equipment should be present and in working order: an electrocardiographic machine and monitor; morphine; a tracheal suction tube and pump; a resuscitator; two sphygmomanometers; oxygen; a hypothermic blanket and cooling circuit—the simpler the better; a thermocouple; biochemical test tubes; small-gauge and large-gauge needles; dextrose solution; an intratracheal tube and a tracheotomy set; the recognized medicaments used for acute cardiac failure and arrest; the surgical equipment (scalpel) for cardiac massage, and a defibrillator in case of arrest.

Because of the very urgency of the condition at hand, it is essential to bring the body requirements to a minimum in order to conform with the deficient blood supply to the heart muscle. Pain, shock and anxiety must be relieved, for these increase the activity of a now damaged heart muscle. It has been observed that hypothermia meets the aforementioned needs better than do other emergency remedies. The patient is given morphine and oxygen for his or her immediate needs, the electrocardiographic recordings are noted, and the temperature of the body is lowered to 34 or 35 C. by placing the patient between hypothermic blankets. No anesthetic is necessary. The metabolism is lowered to lower the needs of the insufficient coronary arteries and may be maintained at the low level for several days if need be. The heart muscle requirements are now down to the level of coronary supply. It is dangerous to bring a damaged heart up to normal or

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near normal function by stimulants or to raise the blood pressure; this is not logically sound. It is like whipping a horse stuck in the mire. One should lower the need of oxygen in the brain and heart to the levels of the new insufficiency. This is best done by means of hypothermia, in association with careful anticoagulation if the need arises. Any shivering of the patient can easily be controlled by relaxants. These are seldom required. The shock associated with the primary lesion can be controlled by intravenous Levophed.

Constant attention is given each patient. The temperature (rectal) can be observed and controlled, and the laboratory tests carried out. Monitoring of the electrocardiogram is helpful. Dextrose may be given intravenously. In cases of severe pulmonary edema not relieved by intravenous morphine, intratracheal aspiration should be urgently and efficiently carried out. If the intratracheal tube is insufficient, a tracheotomy can be quickly performed and direct suction applied by means of a curved-end catheter. It should be remembered that oxygen cannot reach the alveolar sacs through bronchi filled with fluid or froth. Many patients are lost because the bronchi are not first emptied. A clear passage is essential. For drastic conditions drastic means of treatment must be employed if many lives, or even a few, are to be saved in this most productive age group. One should not allow them to drown in their own fluid, which brings on anoxia, fibrillation and death. Many deaths are due to the poorly treated complications of coronary infarction rather than to infarction itself.

When the extreme emergencies arise, i.e., ventricular fibrillation and cardiac arrest, the following steps are taken immediately and concurrently, in order to save time. The patient is placed in the 15-degree Trendelenburg position, and an endotracheal tube is inserted. The resuscitator or oxygen bag is applied, the hypothermia blanket is opened and the left fifth intercostal space and pericardium are opened immediately. Not a second is to be wasted with gloves, towels and the like. "We can clear up infection, but we cannot clear up permanent death." The heart is massaged gently but firmly forty to fifty times per minute with the right hand. Even though fibrillation may be present, massage is continued until a pulse is palpated in the neck; when the defibrillator has been arranged, then one makes contact. One should not "wait" for this apparatus, however, but massage and continue the administration of oxygen manually. One can always get the heart to beat normally, but if one has missed those precious three to four minutes by delay the brain rarely returns to function. Procaine hydrochloride, 1 per cent, may be used for fibrillation in the absence of a defibrillator. Three to 5 cc. of epinephrine hydrochloride is injected into the right ventricle to stimulate contractions.

After the patient's recovery from cardiac arrest the pleural space is drained in the usual manner. The incisions are closed with the lung inflated, and the patient is restored to the low metabolic state until the coronaries have adjusted to a sufficient flow or the patient's state has improved. Dextrose administered intravenously is beneficial; electrocardiographic monitoring is most helpful. Antibiotics may be given.

In a case of cardiac arrest of any type, there is no excuse for waiting for a surgeon or the attending physician. The doctor, intern or doctor anesthetist present should open the thorax and massage the heart at once. To wait is fatal. Every doctor should realize it is part of his duty to carry out this life-saving procedure when cardiac arrest rears its menacing head. No one will be accused of crime for trying to restore or save a life. It is

amazing what can be done when alert judgment and courage unite in these desperate circumstances.

In the presence of a leaking infarction causing cardiac tamponade, the patient is anesthetized and prepared immediately for closure of the rupture, mattress sutures being used for the purpose. A number of herniated infarctions have been resected successfully, but this procedure comes under a separate title and will not be discussed here. The critical period for the appearance of a leak is from the third to the tenth day, depending upon the size of the ischemic area.

The treatment of coronary insufficiency when it is not in the acute infarctive stage varies with the individual case. A number of patients are benefited by medical treatment—anticoagulants, diet and watchful waiting. Some "get by" on noble inactivity alone. In the presence of a deficient coronary blood flow, however, the logical course of action is to increase this flow by any means possible, and to increase it permanently. Cooperation between the physician and the surgeon in charge is essential. Certain medicaments have their place in surgical procedure; all resources must be combined with a view solely to the patient's benefit.

First and foremost, coronary insufficiency must be present. The many clinical and laboratory tests must give positive results. All other associated diagnoses must be considered and proved present or absent, and the patient must be free of extracardiac disease that would contraindicate operation in general. In special cases a coronary arteriogram may be an asset in the verification of insufficiency. Patients with generalized arteriosclerosis, cerebral or nephritic, are not suitable, nor are hypertensive patients. Those with hypertrophy, dilatation or cardiac herniation from previous infarction do not do well. Those with angina decubitus are poor risks and likely to obtain poor results, as are those with cardiac failure and those with arrhythmia. The patient with a positive Wassermann reaction is not a candidate for surgical intervention.

A certain type of patient can expect good to excellent results from a revascularizating operative procedure; namely, the patient who is between 35 and 60 years of age, who has a distinct family history of coronary disease; whose symptoms and signs are confined to the coronary vessels and are increasing in severity; who is suffering from and incapacitated by angina of effort; who is relieved by nitroglycerine for a few minutes, but whose employment and livelihood depend upon his continuing at work. A combined effort should be made by the cardiologist and the cardiac surgeon to relieve such a patient of his distressing and potentially malignant disease. Surgical treatment does not halt the sclerotic lesion present, but it does form new vascular channels for blood to bathe the myocardium, deprived of blood owing to the increasing obliteration of the coronary system, and it is an emergent preventive of death from the frequently recurrent infarction of major proportions. It is teamwork that gives the best results in dealing with these serious human and economic problems. In cases of mitral and aortic lesions associated with coronary insufficiency, the correction of these valvular lesions is of benefit. The mere valvular procedure is sufficient to cause new vessels to pass from the pericardium to the myocardium without even powdering the surfaces. Likewise, in cases of pectus excavatum or hiatus hernia, repair relieves the coronaries from compression.

In these cases of major coronary infarction, other factors being equal, operation should be delayed for six months, in order to increase the much-needed blood flow to

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the ischemic myocardium. Patients in these particular circumstances have the sword of Damocles hanging over them, and they are the more fully entitled to early efforts toward revascularization of the myocardium, before the second or third, and usually fatal, episode takes place, with a mortality rate of at least 90 per cent.

It is my opinion that the medical profession can best serve humanity, either medically or surgically, if it tries to cure or relieve all ills of mankind up to the Biblical age of threescore years and ten. After this age many can be allowed to drift carefully and safely along with conservative treatment, surgical therapy being employed only if there is luminal obstruction that endangers life.

All such therapy should be as nearly physiologic as possible. In a few cases of malignant disease life is prolonged well beyond the Biblical age, but these results should be correlated with the natural history of the disease and its variables. Too often these noble aged men and women sustain iatrogenic lesions much worse than the original disease. With this age group especially one should be considerate of the general pathologic and biochemical makeup and learn to do as little as is possible and yet as much as is physiologically necessary. To every rule there can be exceptions, but one may follow this guiding rule and, still more important, the golden rule.

SUMMARY

Coronary insufficiency is fast becoming the first killer in the United States. Its economic implications in this most productive age are a matter concern.

Present-day single medical treatment is not improving the mortality rate. There are many complicating features in the use of medical treatment alone. A combined effort should be made in the treatment of coronary insufficiency, which is a medical and a surgical disease.

The use of hypothermia in association with some form of medical care has certain advantages in the case of emergent coronary disease, with acute infarction, since it lowers the mortality rate thereof.

Certain measures of emergent surgical care are outlined for acute coronary insufficiency.

The importance of concentrating all patients with coronary lesions in one ward or in rooms under well-trained personnel is pointed out.

Surgical intervention for revascularization of the myocardium has been proved both safe and beneficial, resulting in an acceptably low mortality for this grave type of lesion.

Combined effort and reevaluation of the treatment of coronary disease by the cardiologist and the cardiac surgeon also result in a lower mortality rate. There is a place for separate and combined treatment. Patients with coronary insufficiency should be given the benefit of the therapeutic advances and an increase in longevity whenever possible.

In patients after "threescore years and ten" the Golden Rule should be continued, and surgical treatment of a greater physiological nature only should be considered. Iatrogenic lesions are to be avoided at all cost.

RESUMEN

La insuficiencia coronaria está conquistando el primer puesto como causante de la muerte en los E.E.U.U. Ocurriendo de preferencia en una edad de productividad constituye también un verdadero problema económico.

El tratamiento médico que se emplea hoy día no ha necho disminuir la mortalidad. Hay muchos aspectos complicados en el uso exclusivo del tratamiento médico. Debe hacerse un esfuerzo combinado en el tra-

tamiento de la insuficiencia coronaria que es una enfermedad al tiempo médica y quirúrgica.

El uso de la hipotermia asociada con tros cuidados médicos tiene ciertas ventajas en el caso de una urgencia coronaria con infarto agudo ya que logra disminuir la mortalidad.

Se equematizan algunos medios quirúrgicos para la insuficiencia coronaria aguda. También se sugiere la idea de concentrar a todos enfermos coronarios en salas especiales bajo la vigilancia de personal bien especializado.

Las revascularizaciones quirúrgicas del miocardio está demostrado que son beneficiosas dando como resultado una baja aceptable de la cifra de mortalidad.

El esfuerzo y el criterio combinado del cardiólogo y del cardiocirujano en el tratamiento de las enfermedades coronarias resulta en una mejoría de los resultados.

Las lesiones intraorgánicas deben ser evitadas a toda costa.

ZUSAMMENFASSUNG

Die Koronarinsuffizienz steigt schnell zum ersten Platz unter den Todesursachen in den Vereinigten Staaten an. Vom ökonomischen Standpunkt aus erregt die Erkrankung in unserem höchst produktiven Zeitalter grosses Interresse.

Die heutige ausschliesslich medizinische Behandlung trägt nicht zur Verbesserung der Sterblichkeitsziffer bei. Die Anwendung nur medizinischer Behandlung bringt viele komplizierende Eigenheiten mit sich. Es sollten gemeinsame Anstrengungen gemacht werden, die Koronarinsuffizienz, die eine medizinische und chirurgische Krankheit ist, zu behandeln.

Die Anwendung von Untertemperatur in Verbindung mit irgendeiner Form medizinischer Versorgung hat in Notfällen von Koronarerkrankung mit akutem Infarkt gewisse Vorzüge, da die Sterblichkeitsziffer dadurch herabgesetzt wird.

Gewisse chirurgische Notmassnahmen bei akuter Koronarinsuffizienz werden skizziert.

Es wird darauf hingewiesen, dass es wichtig ist, alle Kranken mit Kranzschlagadererkrankungen in einem Saal oder in Räumen mit gut ausgebildetem Personal unterzubringen.

Der chirurgische Eingriff zur neuen Gefässversorgung des Herzmuskels hat sich als risikoloses und nützliches Verfahren erwiesen, das zu einer für diese schwere Form der Erkrankung annehmbar niedrigen Sterblichkeit führt.

Gemeinsame Bemühungen und gemeinsame neue Auswertung der Behandlung von Kranzadererkrankungen seitens des Kardiologen und des Herzchirurgen führen zur Erniedrigung der Sterblichkeitsziffer. Sowohl die getrennte als auch die kombinierte Behandlung haben ihren Platz. Kranken mit Koronarinsuffizienz muss Gelegenheit gegeben werden, aus den Fortschritten der Therapie Nutzen zu ziehen und, wenn immer möglich, ihr Leben zu verlängern.

Bei Kranken von mehr als 70 Jahren sollte die Anwendung der goldenen Regel fortgesetzt und nur chirurgische Behandlung von grösserem physiologischem Wert in Betracht gezogen werden. Schädigungen durch ärztliches Eingreifen müssen unter allen Umständen vermieden werden.

RÉSUMÉ

L'insuffisance coronaire est en voie de devenir rapidement la cause de décès la plus fréquente aux Etats-Unis. La portée économique de ce phénomène à un moment de haute productivité est un sujet de grandes préoccupations.

Le traitement médical seul n'améliore pas le taux de mortalité actuellement, et celui-ci présente de nombreux points de complication dans son application. Un effort combiné devrait être tenté dans le traitement de l'insuffisance coronarienne,

qui est une affection à la fois médicale et chirurgicale.

L'hypothermie associée à une forme de traitement médical déterminé présente certains avantages dans les cas d'urgence avec infarctus aigu, étant donné qu'elle abaisse le taux de mortalité dans ces cas.

Certains traitement chirurgicaux d'urgence sont décrits pour l'insuffisance coronarienne aiguë.

Il est très important de concentrer tous les patients atteints d'affections coronarienne aiguë.

Il est très important de concentrer tous les patients atteints d'affections coronariennes dans un seul service ou dans des chambres surveilées par un personnel qualifié.

L'intervention chirurgicale pour la revascularisation du myocarde s'est révélée sûre et bénéfique avec un taux de mortalité raisonnable pour ce genre de lésion grave.

La collaboration entre le cardiologue et le spécialiste de chirurgie cardiaque, avec une réévaluation du traitement de l'affection coronarienne a pour résultat d'abaisser le taux de mortalité. Il y a place pour un traitement séparé et combiné. Les malades atteints d'insuffisance coronarienne devraient pouvoir bénéficier des progrès thérapeutiques grâce auxquels dans bien des cas ils jouissent d'une longévité accrue.

Pour une catégorie spéciale de malades il faudrait continuer à appliquer la règle d'or et considérer le traitement chirurgical sous un angle physiologique plus large. Il faut éviter à tout prix les lésions iatrogéniques.

SUMARIO

A insuficiencia coronaria torna-se rapidamente a primeira causa de morte nos Estados Unidos. Seus aspectos economicos na idade mais produtiva tornase assunto serio. O tratamento medico atual não está melhorando a taxa de mortalidade e há muitos aspectos a considerar nesse particular. Deve sertentado um esforço combinado no tratamento medico-cirurgico. O uso da hipotermia associado com medidas medicas tem certas vantagens na emergência quandoha infarto agudo porque assim se abaixa a mortalidade.

Descreve um planejamento cirurgico para a insuficiencia aguda

Salienta a importancia de concentrar todo os pacientes em uma enfermaria assistida por pessoal treinado. A operação de revascularisação do miocardio tem se mostrado segura e benefica resultando n'uma taxa de mortalidade aceitavel nesse tipo de lesão grave.

Tambem redusem a mortalidade a combinação de esforços do cardiologista e do cirurgião embora exista indicaçõesisoladas para os dois tipos de tratamento medico e cirurgico. Nos pacientes já "tocados" algumas veses deve ser mantida a "Regra de Ouro" e o tratamento cirurgico de maior ambito funcional deve ser tentado. As lesões da senectude devem ser combatidas á todo custo.

REFERENCE

1. Beck, C. S.: J.A.M.A. 156:1400-1401 (Nov. 27) 1954.

ADDITIONAL SOURCES

Beck, C. S.: J. Thoracic Surg. 34:329-350, 1958.
Black, A., and Delmonico, J. E.: Am. J. Cardiol. 3:54-73, 1959.
Gorlin, R., and others: Am. Heart J. 19:70-73, 1958.
Segall, H. M.: Canad. M. A. J. 79:540-546, 1958.

Tuberculous Pericarditis

Evaluation of Forty-Seven Cases at Duke Hospital

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Tuberculous pericarditis is often symptomatically dormant and may be difficult to diagnose. Therapeutic success, therefore, is not yet assured, though hopeful preliminary results have been obtained with chemotherapeutic agents. The authors analyze a series of 47 cases observed at Duke Hospital, pointing out that pericardiectomy is a highly valuable procedure in the treatment of this condition.

TUBERCULOSIS of the pericardium is the least common and most serious infection of a serous membrane. It follows a chronic course, being insidiously progressive. It is frequently characterized in its early stages by an inflammatory effusion and culminates in thickening and fibrous contraction of the diseased pericardium. The purpose of this report is to discuss 47 cases of tuberculous pericarditis observed at Duke Hospital in the past twenty-seven years.

Incidence.—Since the original recognition of this disease 104 years ago, there has been wide disagreement as to the incidence of tuberculous pericarditis. Sir William Osler[1] in 1893 analyzed 1,000 autopsies, of which 215 were cases of tuberculosis and 7 had tuberculous pericarditis, giving an incidence of 0.7 per cent. Norris[2] in 1911 found 1,780 cases of tuberculosis in 7,219 consecutive autopsies; 82 of the tuberculous cases had pericarditis, an incidence of 1.1 per cent. However, there is a general agreement[3] that it represents at least 7 per cent of all cases of tuberculosis.

Sex.—The incidence is highest in the males, having been reported as ranging between 70 and 85 per cent[4]. In our series there were 36 male patients (76 per cent) and 11 female patients.

Race.—American writers agree in stating that the condition is more frequent in Negro than in white patients. This, no doubt, gives the impression that it is "rare in Europeans."[8] High susceptibility appears to extend to Negro races also, for Heimann and Binder[5] collected 31 examples among Bantu natives in Johannesburg. Our series comprised 19 white and 28 Negro patients (60 per cent for the Negroes).

Age.—Persons of all ages are affected, the majority in the United States being over 40.[6] By contrast, the average age of English patients is 21.[7] The youngest in our series was 7 years old and the oldest 72 (Table 1).

Route of Pericardial Infection.—It is generally stated that the pericardium may be infected with the tubercle bacillus in one of three ways: (1) via the blood stream; (2) via the lymphatics, and (3) by direct extension from disease in a neighboring structure. Reisman[7] classified tuberculous pericarditis into four types: (1) that associated with generalized miliary tuberculosis, (2) that associated with serous membrane tuberculosis, (3) that due to extension from neighboring foci

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TABLE 1.—*Age Distribution in Tuberculous Pericarditis*

Age, Years	*Cases*
0-10	3
11-20	10
21-30	8
31-40	10
41-50	6
51-60	6
61-70	3
71-80	1
Total	47

and (4) a primary type. Most writers question the existence of primary tuberculosis of the pericardium. Clarke[9] collected from the literature only 11 reported cases of primary pericardial tuberculosis in which the diagnosis could not be questioned. The revival of interest in pericardial constriction and the resultant studies in recent years have led to the general opinion that the primary condition must be less infrequent than these reports suggest. In most cases, tuberculous pericarditis is considered due to extension from neighboring foci. The pericardium has usually become infected by extension from tuberculosis of the mediastinal lymph nodes. Failure to show enlarged mediastinal nodes radiologically cannot exclude tuberculosis of these nodes.

Pathologic Picture.—The course of typical tuberculous pericarditis may be divided into four stages. These are: (1) an acute fibrinous process (dry stage); (2) effusion and moderate thickening of the pericardial surface (stage of effusion); (3) disappearance of most or all of the effusion (stage of absorption), and (4) great thickening of the pericardium and epicardium (stage of pericardial constriction). In most cases there is long-continued infection, and the condition at operation or at autopsy depends on the severity and the duration of the disease. In the earlier stages of this process the membranes are little, if at all, thickened; the tubercles are seen just beneath the endothelial layer, and there may or may not be a fresh exudate of yellowish fibrin. In other instances the contiguous surfaces of the thickened layers are covered with flat, yellowish caseous masses. Collections of thick purulent material are occasionally present between the layers. In the experimental production of tuberculous pericarditis, Postlethwait, Salem, Wilson, Grosekreutz, Sealy and Smith[10] noted that the earliest reaction was loss of the normal sheen of the pericardium and epicardium with accumulation of cloudy, sometimes brownish fluid. Later roughening of these surfaces was noted, and by the end of two weeks, raised, grayish white, slightly irregular patches were seen.

Physiologic Considerations. — Understanding of the altered dynamics and the pathophysiologic aspects of tuberculous pericarditis is an important factor in the clinical management of this disease. The major complication of carditis is constriction; indeed,[11] constrictive pericarditis has been termed the almost inevitable result. With a constricting and limiting layer of dense fibrosis in the pericardial tissues, increasing contraction causes progressive impairment of cardiac function. The chief effect of the fibrosis is to limit diastole. The incoming venous blood cannot be accepted in full amount because of the restricted relaxation, and the pump, being insufficiently supplied, has less to deliver in forcing stroke. This diminution of cardiac output results in the characteristic clinical picture of the disease: weakness, fatigue, limited tolerance for exertion, tachycardia and low pulse pressure. Another significant feature is the increase of systemic venous pressure, which can rise as high as 400 mm. of saline solution. The distended veins are particularly noticeable in the neck, head and abdominal wall. The peripheral venous engorgement re-

sults in edema in the dependent parts of the body, particularly the legs. Cyanosis of varying degree may be present, and the extremities may be blue, cold and uncomfortable. These symptoms and signs are out of proportion to the degree of dyspnea, being more dependent on the elevated venous pressure than on the reduced cardiac output.

The organ on which the effects of the venous stasis are most marked is the liver. Enlargement of the liver with ascitis is one of the cardinal signs of the disease. That the effects of raised venous pressure should be reflected by changes in the liver may be partly due to the absence of valves in the major hepatic veins. Discomfort in the upper part of the abdomen, fullness, anorexia and, in some cases, pain are possibly attributable to the hepatic enlargement. Harrington[12] expressed the opinion that many of the gastric symptoms present are due to the liver damage, secondary to the inflow stasis which has occurred. The spleen is rarely enlarged, and there is little evidence of interference with renal function. Effusion into the pleural cavities is generally accepted as part of the constriction complex.

Symptoms.—Hannesson[13] differentiates two groups of cases, in one of which the clinical features suggest tuberculosis or other acute infection; pericarditis is an incidental observation and is "clinically unimportant." Our series does not include any such cases.

The second group is that in which the pericarditis is "clinically important," with the clinical features pointing to cardiac disease and pericarditis as the presenting symptom. Table 2 shows the various symptoms observed in our series.

The duration of symptoms before the patients were seen was decidedly varied. Thirteen patients complained of symptoms for less than four weeks; 9 for three months, 9 for six months, and 16 for periods varying up to two years. Wood[4a] noted that the patients with a gradual onset of symptoms did less well than those with an acute onset. Of the 19 who died during the first year, the condition in 15 had had a gradual onset. We could not establish such relations, however, as may be seen in Table 3.

Physical Examination.—A febrile reaction was a conspicuous feature in 25 of the 47 cases and was the outstanding sign in patients with acute pericarditis. In patients with circulatory failure the temperature was usually not elevated. The presence of irregular fever in patients with heart failure, especially elderly persons with signs suggesting pericardial disease, should point toward the possibility of tuberculosis of the pericardium.

Tachycardia was present in 30 of the 47 cases; cardiac arrhythmia was present in 6. The increased pulse rate was due

TABLE 2.—*Symptoms in 477 Cases of Tuberculous Pericarditis*

Symptoms	*Cases*	*%*
Dyspnea	33	70
Pain, chest or precordial	16	34
Cough	16	34
Edema	15	32
Abdominal swelling	13	27
Weight loss	7	15
Night sweats	6	12
Meningeal irritation	1	2
Miscellaneous	8	17

TABLE 3.—*Duration of Illness Compared with Mortality Rate in 47 Cases of Tuberculous Pericarditis*

Duration of Symptoms	*Cases*	*Deaths*	*%*
Up to 4 weeks	13	5	40
Up to 3 months	9	3	33
Up to 6 months	9	5	55
Up to 2 years	16	7	43
Total	47	20	

to two factors: (1) increased metabolic requirements secondary to infection, and (2) secondary as a compensatory mechanism to the constrictive process, with decrease in the diastolic filling. Pulsus paradoxicus was present in 19 cases. This is explained by mechanical factors, though the circulatory theory of Heitzig[14] may be acceptable.

In pericardial disease, especially when there is cardiac compression, a low systolic blood pressure (6 cases in our series) and a low pulse pressure (11 cases) may be observed, particularly when the signs are acute. Eight of our patients had elevation of the systolic pressure to over 150 mm. of mercury and 6 had a decrease to less than 100 mm. A decrease in pulse pressure to less than 30 mm. of mercury was noted in 11 of the 47 patients. Thus nothing absolutely characteristic about the average blood pressure levels was noted. More important in diagnosis was the presence of elevated venous pressure. The neck veins were distended markedly in 25 of the 47 patients. Signs probably due to congestive heart failure were peripheral edema in 20 cases; ascites in 21; hepatomegaly in 25, and pleural effusion in 23. Of considerable diagnostic importance in the physical examination are the size and configuration of the heart, the presence of a friction rub, the presence of arrhythmias or murmurs and the quality of the heart sounds. In this group of 47 cases the area of cardiac dullness was increased in 40. The most conspicuous widening was present in patients with effusions. A pericardial friction rub was heard in only 15 cases; a murmur was heard over the pericardium in 14.

Accessory Clinical Data.—Anemia was not a prominent feature in these cases, as the red blood cell count and the hemoglobin content were reduced in only 13. Wide variations were noted in the total white blood cell count. It was below 5,000 per cubic millimeter in 7 cases, between 6,000 and 9,000 in 30 and above 10,000 in 10. The differential count may be of help, however, as there is frequently an increase in the number of small lymphocytes. Such an increase usually indicates the activity of disease, and this was observed in 18 of the 47 patients. The tuberculin skin test gave positive results in 25 of the 30 patients tested. An elevated sedimentation rate was present in 22 cases of the 25 in which this rate was determined.

The aspirated pericardial fluid may be straw-colored or hemorrhagic. Aspiration was carried out in 28 cases, and the fluid was examined cytologically and bacteriologically (smear, culture, and guinea pig inoculation) and for protein content. The cell count was increased, and the cells were usually of the mononuclear or lymphocytic variety.

Roentgen examination may show the classic signs of a pericardial effusion or only widening of the cardiac shadow. A thickened pericardium with calcium deposits may be seen. Fluoroscopic examination may reveal a diminished pulsation of the ventricles. The significance of this increases when the heart is small, since it indicates interference with diastolic filling.

Electrocardiographic study gives remarkably uniform results, the principal feature being a low voltage type of curve and lowering or inversion of the T wave. The loss of inversion of the T wave is commonly observed in Leads I and II. In 26 cases of our series electrocardiograms were compatible with pericardial infection. In 11 other cases they were suggestive but not conclusive.

Studies of liver function showed nothing characteristic, as wide variations were observed with the various tests. The results of these tests were abnormal in 9 cases and normal in 13. Total protein values and the albumin-globulin ratio were abnormal in 12 cases and normal in 18.

Cardiac catheterization was performed in 9 cases, all of constrictive pericarditis. An elevated pressure in the venous system and the right side of the heart was observed. The typical hemodynamic abnormality associated with constrictive pericarditis was diastolic hypertension in the right ventricle. The cardiac output was low, being 1.8 L. with the patient at rest.

Diagnosis.—The cause of acute tuberculous pericarditis is often difficult to prove. The presence of tubercle bacilli on direct smear examination, culture or guinea pig inoculation is necessary for diagnosis. The difficulty of demonstrating this organism in any serous fluid or exudate is well known;[15] its absence, therefore, should not exclude the diagnosis in the presence of other clinical evidence.[16] In our series the diagnosis was proved in 20 cases. In 2, inoculation of a guinea pig with the pericardial fluid gave positive results. In 5, the positive result was obtained by biopsy of the lymph nodes (usually cervical or axillary). In 7 cases tests gave positive results, 2 on smear and 5 on culture. In 6 cases diagnosis was confirmed at autopsy.

There were 27 cases in which the diagnosis of "unproved" or "strongly suspected" tuberculous pericarditis was made. A presumptive diagnosis[11] can be established by reasonable combinations of the following criteria: (1) exclusion of other causes; (2) the presence of tuberculosis elsewhere; (3) massive effusion, especially if the patient appears disproportionately well; (4) a normal sized heart in the constrictive phase; (5) roentgenographic demonstration of a thick, shaggy pericardial wall, after injection of air into the sac; (6) response to specific antituberculous agents, and (7) a positive result from the tuberculin skin test.

Treatment and Prognosis.—Since the introduction of Streptomycin and the antimicrobial drugs, treatment of tuberculous pericarditis has changed considerably. Prior to the current therapeutic era the outlook was quite poor. In our series of 47 patients, 17 were seen before 1948. Eleven of the 17 died, a mortality rate of 65 per cent. Harvey and Whitehill[17] reported 17 cases of tuberculous constrictive pericarditis without effusion; 15 of the patients died. It was not stated what happened to the remaining 2.

The treatment of choice is a combination of Streptomycin with PAS (Para-aminosalicylic) and/or INH (Isoniazid). This method of therapy has shown encouraging results. In desperate cases all three drugs may be used temporarily. Streptomycin is usually given in a dose of 1 Gm. daily in the acute stage and then 1 Gm. twice weekly. INH is given in doses of 100 Gm. three times daily and PAS in a 12 Gm. dose daily.

Goyette and Overhalt[6] advised bed rest throughout the theraputic period, followed by progressive ambulation. They offer the following criteria for inactivity: (1) absence of fever; (2) normal sedimentation rate; (3) normal heart shadow; (4) normal pulse, and (5) a stable (but not necessarily normal) electrocardiogram.

As soon as the disease is reasonably stable, pericardiectomy should be performed to free the ventricles from the contracted and scarred pericardium and epicardium. It is not necessary to remove the pericardium from around the inferior vena cava, as there is little obstruction to the vena caval vessels. Nineteen pericardiectomies have been done by an anterior inframammary approach, with a mortality rate of 20 per cent. There have been no deaths, however, in the last 10 cases.

The ultimate result with regard to survival for patients with tuberculous pericarditis is as yet undetermined. The value of the specific chemotherapeutic agents will not be known until more patients have

been treated and observed for longer periods. Pericardiectomy remains a highly valuable procedure in the treatment of patients with tuberculous pericarditis.

SUMMARY

Tuberculous pericarditis, first described one hundred and four years ago, is a serious lesion, difficult to diagnose and often symptomatically dormant despite the presence of the massive effusion so characteristic of it. Therapeutic success, rare until recently, is not yet assured, despite the hopeful preliminary results obtained with chemotherapeutic agents. An understanding of the altered dynamics and pathophysiologic aspects of pericarditis and cardiac tamponade is important in the clinical management of this disease. Forty-seven cases of tuberculous pericarditis observed at Duke Hospital are evaluated and the clinical observations reported.

ZUSAMMENFASSUNG

Die vor hundertundvier Jahren zuerst beschriebene tuberkuloese Herzbeutelentzuendung stellt eine ernste, schwer zu diagnostizierende Erkrankung dar, die oft trotz Bestehens der so charakteristischen umfangreichen Erguesse keine Symptome hervorruft. Trotz der hoffnungsvollen vorlaeufigen Ergebnisse, die mit chemotherapeutischen Mitteln erzielt wurden, gibt es noch immer kein zuverlaessigen Erfolge, die bis vor kurzem zu den Seltenheiten gehoerten. Zur klinischen Behandlung der Erkrankung ist eine Kenntnis der veraenderten Dynamik und der pathophysiologischen Grundlagen der Herzbeutelentzuendung und der Herztamponade von Wichtigkeit. Es wird eine Analyse von 47 Faellen von tuberkuloeser Herzbeutelentzuendung, die im Duke Hospital behandelt wurden, vorgelegt und ueber die klinischen Beobachtungen berichtet.

RIASSUNTO

La pericardite tubercolare, descritta per la prima volta 104 anni or so mo, è una grave lesione, difficile da diagnosticare e spesso asimtomatica ad onta del grande versamento che la caratterizza. I successi terapeutici, rari fino a poco tempo addietro, sono ancor oggi incerti nonostante le grandi speranze sollevate dall'impiego dei chemioterapici. Per curare questa malattia è indispensabile conoscere le alterazioni della dinamica cardiaca e gli aspetti fisiopatologici della pericardite e del tamponamento cardiaco. Vengono riferite 47 osservazioni di pericardite tubercolare raccolte e studiate al Duke Hospital.

RÉSUMÉ

La péricardite tuberculeuse, décrite pour la première fois il y a 104 ans, est une affection grave, difficile à diagnostiquer, et souvent symptomatiquement l a t e n t e malgré les épanchements massifs qui la caractérisent. Les succès thérapeutiques ont été rares jusqu'à maintenant, en dépit des résultats préliminaires prometteurs obtenus au moyen d'agents chimiothérapiques. Le traitement clinique de cette affection requiert une bonne connaissance des modifications dynamiques et des aspects physiopathologiques de la péricardite (tamponnement cardiaque). Q u a r a n t e-septcas de péricardite tuberculeuse traités au Duke Hospital sont analysés.

RESUMEN

La pericarditis tuberculosa, descrita por primera vez hace 100 años, una enfermedad seria, de diagnóstico difícil y a menudo latente sintomatologicamente a pesar de la presencia del derrame masivo tan característico. Los resultados terapéuticos, raros hasta hace poco, aún no son seguros a pesar de los éxitos alentadores obtenidos con la animioterapia. Para el tratamiento clínico de esta dolencia es preciso un cono-

cimiento exacto del trastorno dinámico y de los aspectos patofisiológicos de la pericarditis y de la tamponada cardiaca. En este trabajo se presenta una evaluación de las observaciones clínicas en 47 casos de pericarditis tuberculosa estudiados en el Hospital Duke.

SUMARIO

Diz que a pericardite tuberculosa descrita a 104 anos atraz é uma molestia seria, de diagnostico dificil e muitas veses asintomatica. O sucesso do tratamento ainda não assegurado hoje apesar dos resultados iniciais obtidos com os agentes quimioterapicos. No evolução do tratamento é necessario compreender a importancia das alterações dinamicas e dos aspectos fisiopatologicos. O A. apresenta comentarios sobre quarenta e sete casos tratados e observados no Duke Hospital.

REFERENCES

1. Osler, W.: Tuberculous Pericarditis, Am. J. Med. Sc. **105**:20, 1893.

2. Norris, G. W.: Cardiac Pathology. Philadelphia: The W. B. Saunders Company, 1911.

3. Herrmann, G. R., and others. Pericarditis, Clinical and Laboratory Data of 130 Cases, Am. Heart J. **43**:641, 1952. McGuire, Jr., and others: Acute Pericarditis, Circulation **9**:425, 1954. Reeves, R. L.: The Cause of Acute Pericarditis, Am. J. Med. Sc. **225**:34, 1953.

4. (a) Wood, J. A.: Tuberculous Pericarditis—Study of 41 Cases with Special Reference to Prognosis, Am. Heart J. **42**:737, 1951. (b) McDermott, W. et al.: Streptomycin in the Treatment of Tuberculous Pericarditis; Report of 3 Cases, Am. Rev. Tuberc. **5**:656, 1949.

5. Heimann, H. L., and Binder, S.: Tuberculous Pericarditis, Brit. Heart J. **2**:165, 1940.

6. Goyette, E. M., Overholt, E. L., and Rapaport, E.: The Treatment of Tuberculous Pericarditis, Circulation, **9**:17, 1954.

7. Reisman, D.: Am. J. Med. Sc. **6**:122, 1901.

8. Sellors, T. H.: Constrictive Pericarditis, Brit. J. Surg. **33**:215, 1946.

9. Clarke, J. A. Jr.: Am. J. Med. Sc. **117**:115, 1929.

10. Postlethwait, R. W.; Salem, M. H.; Wilson, J. R.; Grosskreutz, D. C.; Sealy, W. C., and Smith, D. T.: Proc. Soc. Exp. Biol. Med.: **94**:617, 1957.

11. Spidick, D. H.: Tuberculous Pericarditis, Arch. Int. Med. **98**:737, 1956.

12. Holman, E.: Surgical Treatment of Tuberculous Pericarditis, Arch. Surg. Harrington in Discussion of Holman's paper, **61**:266, 1950.

13. Hannesson, H. Tubercle, **22**:79, 1941.

14. Heitzig, W. M.: J. Mt. Sinai Hosp. **8**:625, 1942.

15. Stepman, T. R., and Owyang, E.: Clinically Primary Tuberculous Pericarditis, Ann. Int. Med. **27**:914, 1947.

16. Peel, A. A. F.: Tuberculous Pericarditis, Brit. Heart J. **10**:195, 1948.

17. Harvey, A. M., and Whitehill, M. R.: Tuberculous Pericarditis, Medicine **16**:45, 1937.

ADDITIONAL SOURCES

Andrews, G. W. S., and others: The Aetiology of Constrictive Pericarditis with Special Reference to Tuberculous Pericarditis, Together with a Note on Polyserositis, Quart. J. Med. **33**:371, 1924.

Bailey, C. P.: Surgery of the Heart. Philadelphia: Lea & Febiger, 1935.

Blalock, A., and Sanford, E. L.: Tuberculous Pericarditis, J. Thoracic Surg. **7**:132, 1938.

Blalock, A.: Chronic Pericardial Disease, Surg., Gynec. & Obst. **73**:433, 1941.

Ehrenhaft, Jr., and Taber, E.: Hemopericardium and Constrictive Pericarditis, J. Thoracic Surg. **24**:355, 1952.

Holman, E., and Willett, F.: The Surgical Correction of Constrictive Pericarditis, Surg., Gynec. & Obst. **89**:129, 1949. Treatment of Active Tuberculous Pericarditis by Pericardiectomy, J.A.M.A. **146**:1, 1951.

Johnson, J., and Kirby, C. K.: A New Incision for Pericardiectomy, Ann. Surg. **133**:540, 1951.

Keefer, C. S.: Tuberculosis of the Pericardium: A Study of Twenty Cases, Ann. Int. Med. **10**:1085, 1937.

Smith, D. T.: Personal communication.

Williams, C., and Soutter, L.: Pericardial Tamponade, Diagnosis and Treatment, Arch. Int. Med. **94**:571, 1954.

Genitourinary Surgery

The Interrelation of Urologic, Gynecologic and Orthopedic with Proctologic Disorders

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THE occurrence of urologic symptoms in the presence of anorectal disease is rather common, although urologic disease producing anorectal symptoms occurs less frequently. Urologic symptoms are considered reflex phenomena and not usually serious. They may, however, be extremely distressing, and on occasion so severe, that the underlying anorectal lesion may be completely overshadowed or overlooked. In other instances, particularly in cases of carcinoma of the rectum, the apparent symptoms may be only those related to the urinary tract, and the original lesion may never be recognized until the neoplasm is well advanced.

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In the presence of any one of a number of pathologic states there is a definite interrelation between the urogenital organs and the anorectal area. Treatment of one area without eradication of a lesion in the other, therefore, can result only in failure to obtain relief for the patient. Treatment in every instance should vary according to the underlying pathologic changes.

The reflex phenomena are assumed to be due to an anatomic relation between the nerves of the anal area and the urogenital nerves. This relation exists mainly through the pudendal (pudic) nerve, which normally arises from the second, third and fourth sacral roots. The pudendal nerve, on reaching the pelvis, divides into three branches: the inferior hemorrhoidal, perineal and dorsal nerves of the penis (clitoris). It is through the intercommunicating nerve fibers of these three branches of the pudendal nerve that symptoms, once produced, are assumed to be transmitted to other areas.

The inferior hemorrhoidal nerve separates into several branches: the muscular, the cutaneous and the communicating. The muscular branches terminate in the external anal sphincter, with the cutaneous branches supplying the skin around the anus. The communicating branches unite the inferior hemorrhoidal nerve with the branches of three other nerves, these being the perineal branches of the posterior cutaneous nerve of the thigh, the pudendal nerve and the fourth sacral nerve.

The perineal nerve arises near the base of the urogenital diaphragm and almost immediately divides into the superficial and deep branches. The deep branch courses forward through the anterior part of the ischiorectal fascia, passing between the two layers of the urogenital diaphragm and supplying branches to the anterior

parts of the levator ani, the external anal sphincter, the perineal muscles and the external urethral sphincter.

It may be seen that such nerve distribution may contribute to the interrelation of urologic symptoms with anorectal disease through irritation, trauma, pressure or inflammation to the nerve fibers. Such conditions as anorectal fistula, hemorrhoids, or ulcerations surrounding the anus may produce such symptoms as pollakiuria, dysuria or even retention of urine. The pollakiuria or frequency of urination may be so severe that it is compulsory to urinate every few moments. In such instances the symptoms produced may simulate acute cystitis, although study of the urine may reveal the specimen devoid of pus cells and the culture negative for any bacterial growth. It is not too uncommon to observe marked frequency of urination in instances of pruritus and/or other cutaneous disease localized around the anus. The associated symptom of frequency is most commonly observed in the female and appears as a chronic inflammatory reaction of the bladder. The patient may complain that the condition has existed for months or even years in spite of therapy to the urinary tract. Dysuria or difficult urination may be so severe that urination occurs with great effort and the urine is eliminated drop by drop, accompanied by an almost constant sensation of intestinal evacuation or the passage of small quantities of watery stool or flatus. Little can be accomplished in the treatment of these reflex urinary symptoms, except for the administration of sedatives and/or antispasmodics, until the anorectal condition has been corrected.

Retention of urine is considered due to spasm of the external sphincter by reflex action through the inferior hemorrhoidal nerve and the deep branch of the perineal nerve, both of these being parts of the pudendal nerve. The retention is actual and complete, beginning abruptly and tending to become painful with the ingestion of fluids. A similar type of retention may and frequently does develop after hemorrhoidectomy, and may present the most distressing discomfort of the entire surgical procedure.

Retention of urine, whether due to reflex phenomena or following an anal surgical procedure, should be controlled by an indwelling Foley urethral catheter until the irritating factors have been eliminated or the immediate postoperative phase passed. During the period of use of the indwelling catheter, it is advised that a chemotherapeutic agent (not an antibiotic), such as the nitrofurons or the sulfons, be administered. It is my opinion that more harm may be perpetrated by intermittent catheterization than by the indwelling catheter. Acute severe cystitis frequently follows intermittent catheterization, as such a procedure is attended alternately with ischemia of the mucosa when the bladder is distended, followed by congestion when the bladder is emptied. Such an alteration of the normal physiologic status provides an ideal situation for the occurrence of infection.

Symptoms referable to the urogenital organs may develop in the presence of infralevator abscess and/or ischiorectal (ischioanal) abscess, owing to reflex impulses through the many communicating branches of the pudendal nerve. Perineal abscess may extend forward beneath the fascia to the base of the scrotum or beyond and, on examination, present a distinct fluctuant mass involving the entire perineum and possibly the scrotum. The mass is tender, preventing the patient from sitting or walking comfortably, and may produce such a symptom as difficulty of urination from pressure on the urethra.

Ischiorectal (ischioanal) abscess may produce difficult or painful urination and is considered due to pressure on, or in-

flammation of, the inferior hemorrhoidal and deep branch of the perineal nerve. Usually, the urologic symptoms are immediately alleviated by evacuation of the abscess.

Such urinary symptoms as hematuria, pollakiuria and stranguria may occur in the presence of adenocarcinoma of the rectum with invasion of the bladder. Cystoscopically the lesion usually appears as a localized discrete area, which may or may not be surrounded by bullous edema, lying in the bas fond of the bladder immediately posterior to the interureteric ridge. Rectal neoplasms with vesical invasion may occasionally be observed without evidence or symptoms of the primary lesion. It should be an axiom that every patient with hematuria should have the benefit of a complete urologic examination including cystoscopic and pyelographic study, and a thorough rectal and/or vaginal examination.

The symptoms observed in a patient when the bladder has been involved by an extrinsic malignant process vary greatly and depend on the area of the bladder involved. The one symptom that is manifest in cases of advanced malignant change, regardless of the area of bladder involved, is the passage of gas and/or fecal material *per urethra*. If the lesion is located on the posterior wall of the bladder, the main symptom is usually hematuria. If the trigone is involved, frequent, painful urination associated with hematuria is often evident. If a ureteral orifice is involved in the process, not only may hematuria associated with frequent, painful urination be present, but discomfort at the costovertebral angle, produced by enlarging hydronephrosis, may occur.

A reversal of the reflex phenomena from the urogenital organs to the anorectal area occurs less frequently, although they are factors to be considered. Infection of the prostate is frequently associated with such symptoms as a smarting, burning sensation around the anus or a sensation of a "ball" or "apple" within the rectum. Also, pain or discomfort, constant but localized in the perineum, may sometimes occur.

In the presence of prostatic hypertrophy attended with difficulty of urination and the presence of varying amounts of residual urine, the patient quite frequently is in an ambulatory uremic state. It is not uncommon for moderate incontinence of watery feces and/or diarrhea to occur, which may suggest the existence of an intestinal lesion. The occurrence of hemorrhoids is also frequently observed as difficulty of urination increases. The occurrence of hemorrhoids is not entirely limited to the male; it may become apparent in the female during the acute phases of severe cystitis, accompanied by tenesmus and frequent, difficult urination.

Carcinoma of the bladder with invasion of the rectum may also be seen occasionally. Such an interrelation may be accompanied by the elimination of urine and fecal material from both the bladder and the bowel. Carcinoma of the prostate may on occasion invade the rectum, presenting on palpation an impression similar to that associated with an annular neoplasm of the rectum.

Two anomalies may occur, which involve both the urogenital system and the anorectal area. The most serious is a persistent cloaca (rectovesical fistula) characterized by an intercommunication between the bladder, vagina and rectal segment in the female. A more common anomaly is a urethrorectal fistula, more frequently observed in the male than in the female. Both conditions are noted in the presence of imperforate anus, although other grave anomalies may coexist with them.

There is a problem that confronts both urologists and proctologists: the induced state of Monilia albicans infection of the anal area, the perineum and the external

genitalia after protracted use of the antibiotics, including penicillin. The indiscriminate use of antibiotic therapy, which causes eradication of the normal protective intestinal flora productive of an external infection, should never be condoned. The symptoms, although not considered fatal, are most distressing to the patient.

There are several other conditions which, because of their importance, should be mentioned but, not being in the anorectal area, they will not be discussed. Diverticulitis of the sigmoid is a condition not infrequently associated with urogenital symptoms. In those instances in which fixation to and perforation of the bladder wall occurs, the formation of a fistulous tract is followed by pyuria, hematuria and the passage of gas and/or fecal material through the urethra. Similar symptoms occur in a limited number of instances of carcinoma of the sigmoid and/or colon. As the interrelating symptoms are pathognomonic, the importance of these conditions should never be overlooked.

RÉSUMÉ

Il y a une corrélation nette entre les affections des organes urogénitaux et celles de la région anorectale à divers stades pathologiques, et l'on ne saurait obtenir de résultats satisfaisants sans un traitement englobant ces deux régions. La thérapeutique doit être adaptée à chaque cas particulier et dictée par les modifications pathologiques en cause.

ZUSAMMENFASSUNG

Bei vielen Krankheitszustaenden besteht eine deutliche Beziehung zwischen den Harn- und Geschlechtsorganen und der After- und Mastdarmgegend.

Die Behandlung eines Gebietes ohne Beseitigung der krankhaften Veraenderungen in dem anderen kann nur zum Versagen der Bemuehungen, den Patienten von seinen Beschwerden zu befreien, fuehren. Entsprechend den zu Grunde liegenden Krankheitsveraenderungen muss die Behandlung in jedem Falle verschieden sein.

RIASSUNTO

In molte condizioni patologiche esistono dei rapporti ben definiti fra gli organi urogenitali e la regione anorettale. Ogni tentativo di cura di una malattia in una delle due regioni, che non venga accompagnato dalla rimozione di stati patologici presenti nell'altra, è destinato all'insuccesso. Il trattamento varia da caso a caso a seconda delle lesioni.

RESUMEN

Ya que existe una interrelación bien definida entre los órganos urogenitales y el área anorrectal en muchos estados patológicos el tratamiento de una lesión de una de estas zonas sin extirpación de la lesión patológica en la otra puede llevar a un fracaso sin beneficio alguno para el paciente. El tratamiento, pues, debe ser en cada caso de acuerdo con las alteraciones patológicas completas.

SUMARIO

Diz que em muitos estados patologicos existe uma correlação nitida entre os orgaõs uro-genitais e a região anorectal. Isto obriga a que o tratamento deve visar os dois aspectos simultaneamente. Assegura que o tratamento deverá va riar conforme as alterações patologicas em causa.

Obstetric and Gynecologic Surgery

Bacterial Infection in Gynecology and Obstetrics

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BACTERIAL infection in gynecologic and obstetric practice, as in other fields of surgery, has increasingly demanded attention in recent years, being a part of the widespread current problem of bacterial infection. Infections in hospitals are more of a problem today than they were twenty-five years ago, and some recent studies have revealed the startling fact that, at present, more persons with bacterial infection die of septicemia than died before chemotherapeutic and antibiotic agents were in use.

This seeming paradox of encountering a greater problem at a time when we are better equipped than ever to deal with infection is accounted for, at least in part, by two factors: (1) The emergence, over the years, of antibiotic-resistant strains of bacteria, notably the staphylococcus, with sometimes a concomitant increase in their virulence, and (2) an apparent increase in the number of infections produced by resistant gram-negative bacteria such as Escherichia coli, Bacillus proteus, Aerobacter aerogenes and Pseudomonas aeruginosa. Two of these, Aerobacter and Pseudomonas, which rarely caused human illness in the preantibiotic era, are now producing an appreciable number of serious infections and even deaths.

In gynecologic practice, however, most infections are caused by the pyogenic bacteria, mostly the streptococcus and stayphylococcus, sometimes in association with other organisms, and by the gonococcus. About 5 per cent, or possibly a slightly smaller percentage, are caused by the tubercle bacillus.

Pathogenic bacteria most often gain access to the female genital tract by way of the vagina, so that the infection is an ascending one. The outstanding exception is, of course, tuberculous infection, which is almost invariably hematogenous, first involving the tubal mucosa and from there spreading downward toward the endometrium in the majority of cases.

Occasionally, bacteria already present in the vaginas of healthy women may

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The majority of gynecologic and obstetric infections are caused by pyogenic bacteria, alone or in association with other organisms, and by gonococci. The infection is most often ascending, with the notable exception of genital tuberculosis, which is almost invariably hematogenous. Gonococci tend to spread by mucosal continuity, while streptococci and staphylococci exhibit predilection for the lymphatic route.

General rules are given for the prevention and management of obstetric and gynecologic infection.

become pathogenic, especially in the presence of traumatized and devitalized tissue. For instance, some types of streptococci are normal inhabitants of the vagina in a large proportion of women; they are ordinarily nonpathogenic and give no indication of their presence, but may become pathogenic and invade the patient's tissues in certain circumstances, such as trauma, operative intervention, obstetric delivery, hemorrhage, exhaustion and so forth, all factors that tend to lower the resistance of the patient to bacterial invasion.

Ascending infection may be localized in the uterine cervix for variable periods, causing cervicitis, or it may continue its upward extension to the upper part of the genital tract, namely, the endometrial cavity, adnexae, parametria and peritoneal cavity. This dissemination may take place in continuity, by surface spread from mucosa to mucosa, attacking first the endometrium, then the tubal mucosa and, at times, continuing to the peritoneal cavity by direct spillage; or dissemination may follow chiefly the lymphatics, quickly extending to the parametria and producing pelvic cellulitis.

The typical example of the first method of dissemination in continuity is furnished by the gonococcus. The infection is usually, at first, localized to the lower genitalia, that is, the Bartholin glands, the periurethral glands and the cervix. Habitually, at the time of the first menses next succeeding the beginning of the infection, the gonococci gain the endometrium, which is at that time most vulnerable to bacterial attack, and rapidly spread to the tubes, producing acute endosalpingitis. The disastrous results of this endosalpingitis are well known, for the gonorrheal infection destroys the tubal mucosa and most frequently results in obliteration of the tubal lumen and permanent sterility.

The lymphatic route of dissemination is typical of streptococcic and staphylococcic infections, which are usually puerperal or postabortal in origin. While these bacteria may also spread by surface extension, they exhibit a marked predilection for the lymphatic and venous channels, giving rise to pelvic lymphangitis, thrombophlebitis and pelvic cellulitis. The lymphatics become filled and obstructed with purulent material and bacteria, the veins become thrombosed, infected and inflamed, and the cellular tissue between the leaves of the broad ligament becomes infiltrated with serous and seropurulent exudate. This exudate is usually firm and often boardlike in consistency. Purulent liquefaction is followed by infiltration into the adjacent zones of loose connective tissue along natural cleavage planes, resulting in parauterine, pararectal and paravesical abscesses; these may sometimes extend into the space of Retzius and may rupture into the bladder or the rectum if not surgically evacuated.

Evacuation of such abscesses may tax the ingenuity of the gynecologist. If the purulent collection tends to point toward the base of the broad ligament, drainage can be obtained by a posterior colpotomy incision: it is necessary, however, to exercise the utmost care to avoid injury to the ureter or uterine vessels, which may have been displaced by the swelling. It is necessary to keep in mind at all times that the abscess is situated in the cellular tissue that also contains the pelvic vessels, the ureters and nerves. The abscess may extend further downward and dissect the posterior vaginal wall away from the rectum, filling the rectovaginal space; drainage is then a little easier, since the colpotomy incision can be placed lower. The purulent collection can also be drained by way of the rectum, but this is not a route favored by gynecologists.

The parametrial abscess often tends to lift the anterior leaf of the broad ligament and dissect toward the inguinal region, between the peritoneum and the pelvic wall. The skin over the inguinal region then becomes red, warm and tender, and fluctuation may appear just above Poupart's ligament. In this case the drainage incision is best placed just above and parallel to Poupart's ligament, again with constant awareness of the anatomic aspects of the region, particularly with regard to the location of important blood vessels.

In rare instances the abscess may extend to the gluteal region by way of the greater sciatic notch.

When the streptococcic or staphylococcic infection reaches the fallopian tube by the lymphatic route, it arrives there by the periphery, producing as its main effect a type of interstitial salpingitis involving chiefly the tubal wall (the mucosa and the tubal lumen may remain relatively unharmed). The effects of this type of salpingitis are far less serious from the standpoint of subsequent fertility than is gonorrheal salpingitis. In fact, it is not at all unusual to observe pregnancy shortly after resolution of the inflammatory process.

When the peritoneum is invaded by the pathogenic bacteria, whether by direct spillage from the tube, by rupture of the tube or by the lymphatic route, acute peritonitis is the result. The seriousness of this peritonitis depends, of course, on the type of infection present, the virulence of the bacteria, the resistance of the patient and the efficacy of the therapy instituted. Streptococcic peritonitis tends to be diffuse and sometimes fulminating, while gonococcal infection tends to be localized to the pelvic peritoneum. Mixed infections aggravate the prognosis, for instance, the gonococci may be associated with streptococci or colon bacilli.

Pelvic peritonitis may become sealed off from the rest of the peritoneal cavity by adhesions between the intestine, uterus and adnexae, and a pelvic abscess may form. This is usually easy to diagnose and easy to drain by means of simple posterior colpotomy.

If there is obstruction to drainage of the uterine cavity in the presence of infection, pyometra may result. Pyometra is a purulent intrauterine collection that may be secondary to hematometra.

The most common cause of obstruction is a neoplastic lesion of the cervix that produces progressive stenosis of the cervical canal. In approximately two-thirds of the cases, pyometra is associated with malignant change in the cervix or the uterus. The obstruction may be caused by the tumor itself, or it may be secondary to intracavitary radiation therapy.

The next most frequent cause of cervical obstruction leading to pyometra formation is cicatricial retraction following surgical procedures such as conization and cauterization and, to a lesser extent, trachelorrhaphy and curettage. For this reason it is of the utmost importance to sound and gently dilate the cervix periodically for several weeks in the follow-up care of patients who have undergone cervical operation, until it is certain that normal patency is maintained.

The third most frequent cause of pyometra is postmenopausal sclerosis and atrophy leading to progressive narrowing or occlusion of the internal os and consequent obstruction to drainage. Senile pyometra may occasionally exist without obstruction, the weak, atrophic myometrium being incapable of expelling the uterine contents. The endometrium is chronically inflamed and partly ulcerated, and there is usually a foul-smelling purulent secretion.

Less frequent causes of complete or par-

tial obstruction leading to the development of pyometra are benign tumors obstructing the internal os or the cervical canal; chronic inflammations, postabortal and puerperal infections and, occasionally, tuberculosis.

Management.—In the management of all these gynecologic infections it is imperative to adhere to sound and established principles of therapy, providing adequate drainage, identifying the organisms involved whenever possible and determining their susceptibility to antibiotics. The gynecologist is in a favorable position in these respects, for his field of operation is relatively accessible, and it is usually possible to obtain material for culture. It is essential that this be done, if at all possible, before any antibiotic treatment is begun. The responsible organisms can usually be identified bacteriologically within forty-eight hours, and in another twenty-four hours a report is available on their sensitivity, or lack of it, to antibiotics.

Certain rules of conduct can be stated for the prevention and management of gynecologic and obstetric infections:

1. Avoid prophylactic and improper use of antibotics. Present evidence appears to indicate that the appearance of antibiotic-resistant strains of bacteria has everywhere been associated with the widespread and indiscriminate use of these drugs.

2. Maintain strict asepsis and antisepsis. Recent work has demonstrated that the nasal passages are the prime source of virulent bacteria in the contamination of surgical wounds. Undoubtedly this is also a potent source of obstetric and gynecologic infection and should be constantly kept in mind in performing vaginal examinations during labor and in operative obstetric and gynecologic practice. Proper masking and the elimination from the labor, delivery and operating rooms of hospital personnel with infections of the upper part of the respiratory tract are essential if sterility is to be maintained.

3. Avoid prolonged delay in performing indications. For uterine infections, adequate drainage must be provided and maintained, and the evacuation and drainage of abscesses should be carried out promptly.

4. Obtain material for culture and identification of the offending organisms and antibiotic sensitivity testing, as a guide to appropriate antibiotic therapy. Otherwise there is risk of employing the wrong antibiotic or combination of antibiotics, which may be ineffective against the specific infection present and may do harm by destroying the nonpathogenic saprophytic flora that undoubtedly play a role in the protection and defense of the body.

5. Employ the indicated antibiotics in adequate doses and for sufficient periods. This is self-explanatory and requires no further elaboration.

6. Isolate all patients with infection.

SUMMARY

The majority of gynecologic and obstetric infections are caused by pyogenic bacteria, alone or in association with other organisms, and by gonococci. The infection is most often ascending, with the notable exception of genital tuberculosis which is almost invariably hematogenous.

Gonococci tend to spread by mucosal continuity, while streptococci and staphylococci exhibit predilection for the lymphatic route.

Parametrial abscesses are sometimes difficult to evacuate, but adequate drainage must be established as a part of sound therapy.

The cause of pyometra are reviewed, with emphasis on its frequent association with uterine malignant change.

General rules of conduct are given for the prevention and management of obstetric and gynecologic infection.

ZUSAMMENFASSUNG

Die meisten frauenärztlichen und geburtshilflichen Infektionen werden durch eitererregende Bakterien allein oder in Verbindung mit anderen Organismen und durch Gonokokken hervorgerufen. Mit der bemerkenswerten Ausnahme der Genitaltuberkulose, die fast ausnahmslos auf dem Blutwege zustande kommt, handelt es sich meistens um aufsteigende Infektionen.

Die Gonokokken haben die Neigung, sich durch Kontinuität in der Schleimhaut zu verbreiten, während Streptokokken und Staphylokokken eine Vorliebe für den lymphatischen Weg zeigen.

Abszesse des Parametriums lassen sich manchmal schwer entleeren, eine angemessene Drainierung muss aber als Teil einer ordentlichen Behandlung durchgeführt werden.

Die Ursachen der Pyometra werden unter Hervorhebung ihrer häufigen Vergesellschaftung mit bösartigen Veränderungen der Gebärmutter besprochen.

Allgemeine Verhaltungsmassregeln zur Verhütung und Behandlung geburtshilflicher und gynäkologischer Infektionen werden aufgestellt.

RÉSUMÉ

La majorité des infections gynécologiques et obstétricales sont dues à des bactéries pyogènes, seules ou associées à d'autres organismes, ainsi qu'aux gonocoques. L'affection est le plus souvent ascendante, avec une exception notable, celle de la tuberculose génitale, qui est presqu'invariablement hématogène.

Les gonocoques tendent à se disséminer par la continuité de la muqueuse, alors que les strepto- et les staphylocoques essaiment plutôt par la voie lymphatique.

Les abcès juxta-utérins sont parfois difficiles à évacuer, mais il faut établir un bon drainage, qui fait partie d'une saine thérapeutique.

Les causes de la pyométrie sont analysées; elle est fréquemment associée au cancer de l'uterus, modification utérine maligne.

Des régles générales pour la prévention et le traitement des infections gynécologiques et obstétricales sont proposées.

RIASSUNTO

La maggior parte delle infezioni ginecologiche e ostetriche sono causate da batteri piogeni, soli o associati ad altri microorganismi, e dai gonococchi. L'infezione é spesso ascendente, con l'eccezione della tubercolosi genitale che di regola é ematogena.

I gonococchi tendono a diffondersi per continuitá mucosa, mentre gli stafilococchi e gli streptococchi mostrano una predilezione per le vie linfatiche, Gli ascessi parametrali sono a volte difficili da evacuare, ma il drenaggio deve comunque essere tentato come parte integrante di una cura efficace.

Vengono ripassate le cause del piometra, segnalando la sua frequente associazione con il carcinoma uterino. Vengono fornite le regole generali di condotta per la prevenzione e la cura delle infezioni ostetriche e ginecologiche.

RESUMEN

La mayoría de las afecciones obstétricas o ginecológicas son causadas por las bacterias piógenas solas o asociadas con otros organismos, y por el gonococo. La infección es casi siempre ascendente a excepción de la tuberculosis genital que se produce casi invariablemente por la vía hematógena.

Los gonococos tienden a propagarse por la continuidad de la mucosa mientras que el estafilo y el estreptococo prefieren la vía linfática.

Los abscesos paramétricos son a veces difíciles de evacuar pero un drenaje ade-

cuado debe establecerse como parte principal de su terapéutica.

Se revisan las causas del piometra llamando especialmente la atención sobre su frecuente asociación con la degeneración uterina maligna.

Se dan reglas generales de conducta para la prevención y tratamiento de las infecciones obstétricas y ginecológicas.

SUMARIO

A maioria das infecções obstetricas e ginecologicas são causadas por bacterias piogenicas, isoladas ou em associação e pelo gonococco. A infecção, excepto a tuberculosa, é ascendente. O gonococco invade a mucosa emquanto os estrepto e estafilococcos tem predileção pela via linfatica. Os abcessos parametrias são dificeis de drenar mas devem ser adequabdamente drenados. A causa da piometrio é revista salientando a frequente associação com as modificações uterinas malignas. Estabelece regras gerais de conduta na prevenção e tratamento dessas infecções.

BIBLIOGRAPHY

Eastman, N. J.: Williams & Obstetrics. New York: Appleton-Century-Crofts, Inc., 1956. 11th ed., p. 970.

Rubin, I. C., and Novak, J.: Integrated Gynecology. New York: McGraw-Hill, 1956, vol. 1, p. 474.

Browne, A. F., and others: Staphylococcic Wound Infections, J.A.M.A. **170**:1274, 1959.

Measures to Combat Antibiotic-Resistant Infections in Hospitals, Bull. A. C. S. **44**:73, 1959.

Dunn, L. J.; Robinson, J. C., and Steer, C. M.: Am. J. Obst. & Gynec. **78**:335, 1959.

Durfee, R. B.: Posterior Colpotomy Incisions in Gynecologic Disease, J.A.M.A. **169**:1594, 1959.

Hall, W. H.: Tests for Drug Susceptibility of Bacteria in Infections, Modern Med. **27**:73, 1959.

Hesseltine, H. C.: Pelvic Inflammatory Disease, S. Clin. North America **33**:269, 1953.

Finland, M.: Jones, W. F. Jr., and Barnes, M. S.: Occurrence of Serious Bacterial Infections Since Introduction of Antibacterial Agents, J.A.M.A. **170**:2188, 1959.

Novak, E., and Novak, E. R.: Textbook of Gynecology. Baltimore: The Williams and Wilkins Company, 1956. 5th ed., p. 397.

Freud's revival of the ancient Assyrian method of questioning directed at the patient's memory and inmost thoughts did more than vindicate the "personalism" of the ancient Semitic medicine. It made psychiatry, and then medicine in general, concentrate upon another aspect of the patient. Thanks to Freud, the patient became more of a multidimensional organism in the eyes of the physician.

The clinician for centuries had been treating his patients, sometimes with considerable success, as a biologic mechanism. Sydenham, Trousseau, and Osler did that. The medical pathologist looked upon his patient as a physical object or as a disturbed biologic entity. Freud was among the first to compel medicine to examine the patient more as a historical and sociobiologic organism.

As against the concept of *homo aeternus* or *homo coelestis*, Freud was interested in *homo natura* and wished to define his psychology, introducing anthropologic and "auditory" attitudes in the study of mental diseases.

—*Marti-Ibañez*

Sinografin: An Opaque Medium for Hysterosalpingography

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THE search for the ideal agent for hysterography has been reviewed many times. It is generally conceded that iodized oil from the roentgenographic point of view has been excellent.

In 1950 I reported my results in 501 patients with the use of lipiodol.[1] There were no deaths, lymphatic injections or embolic complications. All patients had cramps, of varying severity. A few had minor abdominal pain with nausea. Two patients had pelvic inflammatory symptoms necessitating surgical intervention. Each had bilateral pyosalpinx with acute pelvic peritonitis. Bilateral salpingectomy was performed, and complete recovery followed. Had antibiotics been available, the operations might have been avoidable. The pathologic diagnosis was bilateral pyosalpinx. The oil may have contributed to the acute exacerbation of the salpingitis.

Because of the long delay in the absorption of oil in the tubes and peritoneal cavity, I was anxious to try an aqueous solution as a contrast medium. The first substance I used was visco-rayopake.* The roentgenograms showed inferior contrast, and there was more pain and more leakage about the cannula in the cervix than with the iodized oil. The rapid peritoneal absorption also made diagnosis difficult. I discontinued its use on the basis of poor contrast, peritoneal pain and to rapid absorption. No traces of the medium were perceptible in thirty minutes. Oil was again used until the aqueous preparation of Salpix** was made available. This resulted in better contrast, but the absorption rate was thirty to sixty minutes, so I again discontinued the aqueous form again and used the preparation Ethiodol,† which was quite satisfactory. When Sinografin‡ became available for study I was anxious to try it. The results have been most satisfactory.

Sinografin[2] is a 70 per cent weight/volume aqueous solution of the methyl-glucamine salt of N-N'-adipyl-bis (3-amino-2,4,6, triiodobenzoic acid). The iodine content of the 70 per cent solution is ap-

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Sinografin has proved to be an excellent opaque medium for visualization of the uterotubal pattern. The safety of its use, the lack of pain, the rate of absorption, the ease of administration and the good quality of the roentgenograms make it a most desirable addition to the gynecologist's armamentarium. The most common indication for its use is sterility.

*Diethanolamine salt of 2, 4-dioxo-3 iodo-6 methyl tetrahydropyridine acetic acid plus a 3.5 per cent concentration of polyvinol alcohol (Hoffmann-LaRoche, Inc.).

**Sodium acetylaminotriiodobenzoate in polyvinylpyrolidine (Ortho Research Foundation, Raritan, New Jersey).

†Ethiodized oil Ethyl-ester of iodinated poppy seed oil, 37% iodine. Viscosity 0.5-1. poise (E. Fougera & Co., Inc., New York City, New York).

‡Squibb, Iodipamide Methylglucamine 70%. The Squibb Institute for Medical Research (E. R. Squibb & Sons, New Brunswick, New Jersey).

proximately 34.84 per cent or 348.4 mg. of iodine per cubic centimeter of solution. It has a viscosity of 55 centipoises at 20 C. and 18 centipoises at 37 C. It contains no viscosity-producing additives. No anesthetic agent is required, since the material causes no pain.[3] Excretion is principally via the liver.[4] Ten per cent or less is excreted through the kidneys, except in persons with poor hepatic function. In irritation tests at the Squibb Institute, injections of Sinografin into the fallopian tube of the rabbit and the uterus of the dog failed to produce any evidence of irritation on either gross or microscopic examination. Erbsloh[5] in clinical investigation, observed that use of the preparation was not associated with foreign body granuloma formation. This phenomenon was encountered with previous water-soluble media containing viscosity-producing substances, such as carboxymethyl cellulose.

Sinografin No. II was developed and replaced Sinografin No. I because of some reports of delayed pain in 5 to 20 per cent of the patients about four hours after the procedure. This has been eliminated with Sinografin No. II. I encountered no problem of pain when I used the first preparation.

This second formulation contains 40 per cent Renografin (as acid) and 20 per cent cholografin (as acid). The viscosity of the material is 29.8 centipoises at 25 C. The viscosity depends on its constituents. The disposition of both major components of Sinografin No. II, Renografin and cholografin, after intravenous administration, are known. Administered intravenously, Renografin is rapidly carried to the kidneys and excreted in sufficient concentration to permit opacification of the renal passages within five to fifteen minutes. Cholografin is carried to the liver, where it is rapidly secreted in the bile within ten to fifteen minutes after injection. Both components of Sinografin No. II have been administered intravenously to man with only transitory side effects.

Method.—The gynograph of Weisman* and the syringe method have both been used in this study. It is realized that gynecologists use various technics, and many have probably used different ones until they found the one best satisfying their desires. I passed from the syringe method of early years through several technics and methods to the use of an instrument exhibited in 1950 at the first International Congress of Obstetrics and Gynecology, designed by Dr. Weisman and manufactured by The Goodman Kleiner Co., Inc., New York.

This instrument allows versatility and a minimum of pain during the administration of an opaque medium. The reason is that under controlled carbon dioxide gas pressure the agent, as it enters, meets with little resistance on the part of the smooth muscle in the uterus or tubes. In this study the procedure was done during the patient's preovulatory phase and after menstrual bleeding had ceased. The technic is relatively simple. The instruments are boiled and transferred to the roentgenographic room. The patient is placed on the roentgen table, with the heels in stirrups. A vaginal speculum is inserted, and the cervix is painted with tincture of merthiolate. After the self-retaining cannula, secured by a tenaculum, is in place, the vaginal speculum is removed and the patient removes her feet from the stirrups and slides up on the table, making a place for the gynograph to rest. This places the patient in a more comfortable position. A cannula (capacity 1.5 cc.) has been filled with Sinografin, which expels all the air, and the stopcock is closed before it is placed in the cervix. I do not probe the uterus, but the slight bleeding that it might produce, causing an admixture of

*Manufacturer, The Goodman Kleiner Co., Inc. New York, N.Y.

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blood with Sinografin, would not create an artefact, which may occur with lipiodol and blood. To prevent any false interpretation from movement of the opaque medium in the uterus, I wait ten to fifteen seconds from the time of injection before I take the first exposure. I do not wait after grasping the cervix for five minutes, as recommended by Youssef.[9] After I had noted that Sinografin passed into the uterus readily even at a pressure of forty to sixty mm. of mercury, I decided to try the syringe method again, using a self-retaining cannula so that the speculum could be removed before the roentgenogram was taken. For improved visualization of the cervical canal and isthmus of the uterus, only 1.5 cm. of the cannula is introduced into the cervix.

The Sinografin is distributed in 10 cc. vials; 1.5 to 2 cc. will usually fill the uterus and often the tubes, but in most cases a larger amount is necessary to obtain a good spill from the tubes and demonstrate any pathologic change that may be present. The medium was first injected by the same technic as lipiodol; pressure of 150 mm. of mercury was used without fluoroscopic control, and when 2 cc. had entered the uterus a film was taken. This showed defects, such as endometrial polyps, submucous fibroids, defects in the cervix, congenital anomalies and other abnormalities. The time necessary for this amount to enter was usually ten to fifteen seconds, whereas oil would take five to six minutes. A second film was taken when another three or four cc. of the medium had passed from the syringe. This took about sixty to ninety seconds. The second exposure was then made, and the cannula was removed from the cervix. The whole procedure took about three to five minutes, in contrast to fifteen to twenty minutes when oil had been used. In the early investigation films were taken at thirty minutes, one hour, two hours, three hours and four hours respectively. In the thirty-minute and sixty-minute films the medium could be seen about the loops of the small bowel, making a diagnosis of patency comparable in accuracy to that obtainable with a twenty-four-hour film when the oil medium was used. In the two-hour and three-hour films the shadow showed decreasing contrast, indicating quick absorption of the substance. In the four-hour film, and sometimes in the three-hour film, there was no evidence of any foreign substance in the pelvis. The procedure adopted is to take a roentgenogram when 1.5 cc. has entered, again when 3 or 4 cc. more has entered and the last one in thirty minutes. Lateral films may also be taken if desired, and with the retroverted and acutely anteflexed uterus it may offer some additional information.

Results.—Ten patients were studied with Sinografin No. I and 40 with Sinografin No. II. There were no undesirable side reactions with either. The films have showed good to excellent contrast in all exposures. The first film, with 1.5 to 2 cc. of the medium injected, gave evidence of tubal filling and a spill in 62.5 per cent when the tubes were patent; thus it may be seen that a very small amount will outline the nonpregnant uterus and the tubes. Tests for sensitivity were done, 1 minim being injected intracutaneously in the forearm. Local irritation was apparent in all patients, but there were no anaphylactoid reactions and no local evidence of wheal formation. The intravenous test solution of 1 cc. ampule, furnished with each 10 cc. ampule, has not been considered necessary and hence was not done in this study. The intracutaneous test was also discontinued after the first 10 patients had been tested, and now it is done only if there is a history of allergy.

No complications followed this procedure. Pain is difficult to evaluate. Not one patient required an analgesic. Most patients admit discomfort when the te-

naculum grasps the cervix, and with that as a criterion, I would say no patient evidenced more discomfort during the procedure than when the tenaculum was applied to the cervix. With lipiodol and with water-soluble agents I used earlier, I have been compelled, in a few instances, to stop the procedure because of pain or faintness, but thus far it has not been necessary with Sinografin. To list pain as a complication, then, applies only to the patient who shows evidence of pain visible to the doctor and the nurse.

Adverse reactions have been judged by the patients' answers when questioned. Pain on administration was mentioned by 2; cramps after going home, by 2; headache, faintness, and weakness, by none; nausea, by 1; vomiting and fever, by none, and vaginal irritation, by 2.

Indications.—Indications for hysterosalpingographic study vary with individual gynecologists. The ones usually considered are abnormal uterine bleeding, amenorrhea, cervical disease, congenital anomalies, dysmenorrhea, dyspareunia, habitual abortion, infertility, postmenopausal bleeding and surgical ligation of the tubes. The ones in question are the diagnosis of abdominal pregnancy, the localization of an ectopic pregnancy, and the diagnosis of endometrial carcinoma. The ones observed in this study were as follows: infertility, 38; missed abortion, 1; dysmenorrhea, 1; menorrhagia, 2; fibroid uterus, 1; anomalies, 2; incompetent cervix, 1; diagnosis of successful tubal ligation, 1; hydrosalpinx, 1; myohypertrophy of uterus, 1, and adenomyomas of the uterus, 1.

The contraindications to hysterographic study are bleeding from any cause, severe vaginal or cervical infection; present or recent pelvic inflammatory disease; fevers; cardiorenal disease; impaired hepatic function; recent curettage, and malignant tumors of the genitalia. It should not be employed for the patient who exhibits sensitivity to the test dose and who has a history of allergy.

COMMENT

Water-soluble media used by various investigators prior to the production of Sinografin gave more pain than when oil was used. Steinberg[6] reported pain so severe in one case that the patient went into shock. He also calls our attention to the fact that water soluble media is absorbed within fifteen to thirty minutes after injection.[6] This is true for some of the early preparations, but not for Sinografin. A good contrast shadow is present in the one-hour exposure, but the maximum contrast is seen in thirty minutes. A shadow is still visible in two hours and in some instances three hours, but in four hours it is absent. The amount used makes a slight difference in the absorption time. Until I used Sinografin I considered the twenty-four-hour film indispensable to the accurate diagnosis of tubal patency. In my opinion, spill can be definitely and accurately diagnosed from the thirty-minute film.

The value of routine hysterographic study in all cases of infertility is apparent. Different investigators have demonstrated and reported that the procedure has therapeutic as well as diagnostic value.[7]

Roentgenographic Interpretations.—The technic of taking a roentgenogram is much simpler than the proper interpretation of it.

The fractional method of salpingographic study increases the accuracy of the findings. One and five-tenths cc. of the opaque medium may demonstrate a filling defect, whereas 4 or 5 cc. may completely obliterate it.

A mottled appearance in the shadow may indicate a polypoid endometrium, or it may be due to air bubbles in the medium. The hyperplastic endometrium may be demonstrated by its feathered or mottled

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appearance in the film, but it has also been observed when exposure is made too soon after injection of the opaque medium, before the fluid is at rest.[8] Congenital anomalies make a most fascinating group for study, but here again one may be led into false conclusions. A fibromyoma of the uterus in the fundus may simulate a bicornuate uterus.

Rommer[10] has remarked that the saddle-shaped uterine shadow offers a poor prognosis for fertility. Trythall,[11] using Ethiodol, noted that the majority of patients with an inadequate cervix show an abnormal uterine contour. The predominant variation presented is an arcuate type, the cavity having a truncated appearance. The cervicouterine angle is poorly defined.

There are limitations, therefore, to the accuracy of roentgen interpretation of hysterosalpingograms. Experience and the correlation of history and physical signs aid in arriving at the correct interpretation. It is generally conceded that the gynecologist, rather than the roentgenologist should interpret the films.

Author's Note: I wish to express my thanks to Dr. Mark H. Lund of The Squibb Institute for Medical Research for supplying Sinografin for this study.

SCHLUSSFOLGERUNG

Das Sinografin hat sich als ein ausgezeichnetes Kontrastmittel zur Darstellung der Gebärmutterhöhle und der Eileiter erwiesen. Die Unschädlichkeit der Anwendung des Mittels, die Schmerzlosigkeit, die Absorptionsgeschwindigkeit, die Leichtigkeit der Verabfolgung und die gute Qualität der Röntgenaufnahmen haben dazu beigetragen, das Sinografin zu einem sehr begehrten Zusatz im Rüstzeug des Gynäkologen zu machen. Die häufigste Indikation seiner Anwendung liegt in der Behandlung der Sterilität.

CONCLUSIONS

La sinografine s'est révélée un excellent produit opaque pour la mise en évidence du schéma utérotubaire. La sécurité de son utilisation, l'absence de douleur, sont taux d'absorption, la facilité de son administration et la bonne qualité des radiographies qu'il permet d'obtenir en font un instrument précieux dans l'arsenal du gynécologue. Son indication la plus fréquente se trouve dans le traitement de la stérilité.

CONCLUSIONES

El sinografín se ha mostrado como un excelente medio opaca para la visualización uterotubal. La seguridad de su empleo, la falta de dolor, el grado de absorción, la facilidad de administración y la buena calidad de las radiografías que proporciona hacen del sinografín un excelente medio en el armamentarium del ginecólogo. Su indicación más frecente es el tratamiento de la esterilidad.

CONCLUSAO

A sinografina provou ser um meiodde contraste excelente para visualisação uterotubaria. Seguro, indolor, facil de administrar e boa qualidade das radiografias são atributos desejaveis pelo ginecologista. A indicação mais comum é o tratamento da esterelidade.

REFERENCES

1. Brougher, J. C.: Uterotubal Studies Using Lipiodol, J. Internat. Coll. Surgeons 15:603-607, 1950.

2. Squibb Institute for Medical Research: Information for Clinical Investigators. New Brunswick, N.J.: The Squibb Institute for Medical Research, 1959.

3. Thomas, B. G. H.: Pharmacological Studies on High Potency Cholografin. New Brunswick, N.J.: The Squibb Institute for Medical Research, 1955.

4. Technical information received from A. B. Schering (Berlin) by E. R. Squibb & Sons.

5. Erbsloh, J.: Discussion of Sterility at the Fiftieth Meeting of the Northwest German Society for Gynecology, May 21, 1955, Hamburg, Germany.

6. Steinberg, W.: Hysterosalpingography with

Ethiodol, Am. J. Obst. & Gynec. 75:144-148, 1958.
7. Becker, S.: The Value of Hysterosalpingography in the Diagnosis and Therapy of Infertility, J.A.M.A. 12:332-334, 1957.
8. Sweeney, W. J. III: Hysterosalpingography: Postoperative Hysterograms, Obst. & Gynec. 12:83, 1958.
9. Youssef, A. F.: The Uterine Isthmus and Its Sphincter Mechanism: A Radiographic Study. Am. J. Obst. & Gynec., 75:1305-1319, 1958.
10. Rommer, J. J.: Sterility—Its Cause and Its Treatment. Springfield, Ill.: Charles C Thomas, Publisher, 1952, p. 194.
11. Trythall, S. W.: Congenital Inadequacy of the Cervix as a Cause of Infertility, J. Michigan State M. Soc. 57:711-714, 1958.

The last twenty-five years of Hunter's busy life were spent as surgeon to St. George's Hospital, which had been founded only some twenty years when he joined as a student. It had little tradition behind it—doubtless a good thing from Hunter's point of view. The hospital came into being as the result of a difference of opinion amongst the supporters of the old Westminster Infirmary which had outgrown its premises. The majority favoured removal to a site not far away, in Castle Lane, Pimlico; but a small, though influential minority, amongst whom were members of the medical staff, regarded this site as unsuitable, and a division of opinion resulted which led to the foundation of two teaching hospitals. Westminster remained near the old infirmary site, whilst the dissentient supporters rented and eventually bought Lanesborough House, on the edge of Hyde Park, and founded a new hospital known as St. George's. More houses and land were soon acquired; thirty beds grew to sixty and before Hunter died had reached two hundred. Beyond the hospital was open country, with the turnpike at Hyde Park Corner and the villages of Kensington, Earl's Court and Brompton near by. Sir Benjamin Brodie describes how he used to walk out in the evenings from his students' lodgings in Knightsbridge to listen to the nightingales in a lane beyond Holland House. Students were apprenticed to the physicians and surgeons, who taught what seemed right in their own eyes. St. George's was a new venture, says Paget, with no charter, no endowment, no tradition, and governed by borrowed rules. Little imagination is needed to picture the iconoclastic John Hunter in such an environment. He shared the enthusiasms of a young teaching institution, but he was no great lover of old surgical traditions and he did not suffer fools gladly. He taught on entirely new lines with a background of the new science, the latest experience of war surgery, and shrewd common sense; and students flocked to his ward rounds.

—Gloyne

Plastic and Reconstructive Surgery

Hereditary Blepharophimosis, Ptosis, and Epicanthus Inversus

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FOR more than one hundred years there has been repeated reference in the literature to a hereditary triad of clinical observations, manifest by blepharophimosis, ptosis and epicanthus inversus, which are so strikingly consistent that some further attempt to categorize them as a syndrome should be considered. This was first suggested by O'Connor and McGregor (1953).[1]

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The authors review blepharophimosis, ptosis and epicanthus inversus as a triad characterizing a true hereditary extraocular syndrome first suggested by O'Connor and McGregor.

Sixty-eight cases are reviewed, in which a presenting complaint of ptosis was made at the Owens-Meade Clinic from 1941 to 1958. Nine of the patients had associated epicanthus inversus and blepharophimosis. Four of the 9 were from one family.

The coexistence of these three conditions is important, and its significance should be taken into consideration in planning functional and cosmetic reconstruction, especially with regard to the nature of the ptosis and the specific type of epicanthus inversus, since these do not respond well to most methods of surgical repair.

The importance of recognizing the coexistence of these features as an entity must be emphasized if one is to appreciate the problem of their functional and cosmetic reconstruction.

An attempt to establish this triad as a true syndrome is made difficult by a review of the literature. The various classifications of ptosis, the many references to epicanthus without specification of type, the incomplete description of clinical features in some family trees, the use of the terms "congenital" and "hereditary" interchangeably and the reference to other overlapping extraocular anomalies as variations of this entity all contribute to this perplexity.

The hereditary influence, at least with regard to blepharophimosis, has been established by Von Ammon (1841),[2] who first described this condition, as well as Komoto (1921),[3] Dimitry (1921),[4] Braun (1922),[5] Franceschetti (1930),[6] Johnson (1956)[7] and others.

The coexistence of hereditary blepharophimosis with ptosis, associated with epicanthus of one reported type or another,

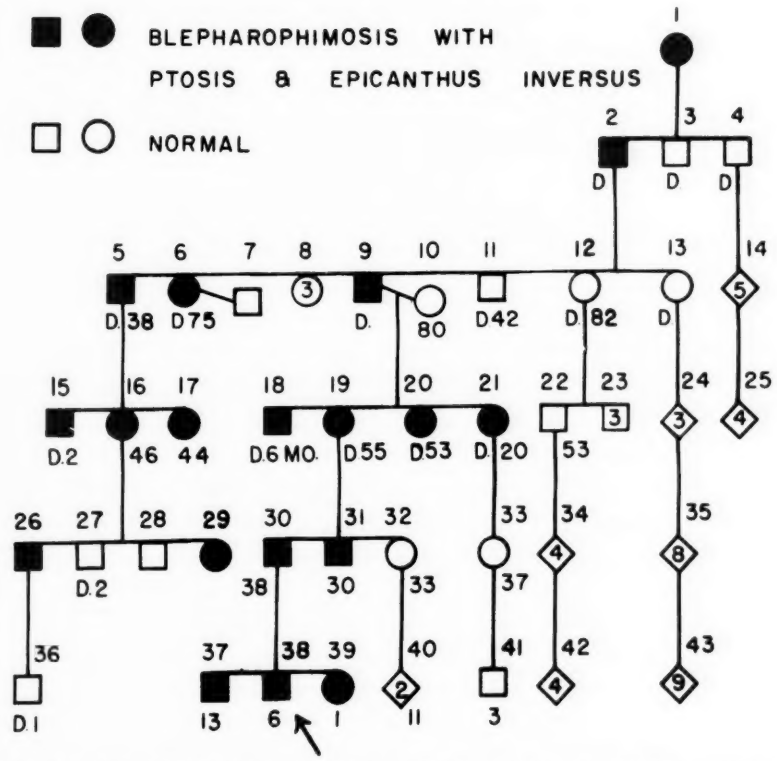

Fig. 1.—Revised and extended pedigree of kindred first reported by Dimitry (1921),[4] showing dominant type of blepharophimosis with ptosis and epicanthus inversus. Reference numbers of persons are above symbols; numbers within symbols are numbers of persons, if more than one, represented by a single symbol.

has been demonstrated in various family trees by Dimitry (1921),[4] Usher (1925),[8] Cockayne (1931),[9] Ross (1932),[10] Hughes (1955)[11] and many others.

Some of the problems in establishing the relation between blepharophimosis, ptosis and the specific type of epicanthus in question may be demonstrated, for example, by the following abstracts:

Rodin (1935)[12] classified hereditary ptosis as follows:

1. Hereditary congenital ptosis.
2. Hereditary ptosis with external ophthalmoplegia.
3. Hereditary noncongenital ptosis.
4. Hereditary ptosis with epicanthus.

No mention was made of any type associated with blepharophimosis, nor was epicanthus apparently differentiated.

Aebli (1950),[13] in discussing true types and pseudotypes of ptosis, did not mention any type associated with blepharophimosis or epicanthus.

Berke (1953)[14] classified 200 cases of "congenital" ptosis into four groups, as follows:

1. Congenital ptosis with normal function of the superior rectus muscle.
2. Congenital ptosis with weak function of the superior rectus muscle.
3. Congenital ptosis with the Marcus-Gunn phenomenon.

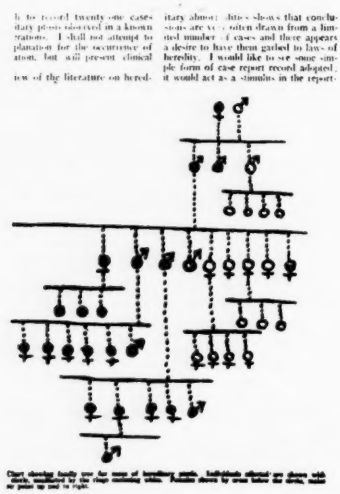

Fig. 2.—Original pedigree of Dimitry (1921)[4] *(Dimitry, Am. J. O. 4:65, 4656-5195, 1921)*

4. Congenital ptosis with blepharophimosis.

In the fourth group there is no reference to the presence of epicanthus inversus, although descriptive clinical photographs reveal this type of epicanthus.

Hughes (1955),[11] writing on the surgical treatment of congenital palpebral phimosis with associated ptosis, stated: "There is frequently a rounded fold of skin hiding the medial canthus, and in marked cases, a true or inverted epicanthal fold."

Johnson (1954),[15] in discussing blepharoptosis, stated that the "true type" of epicanthus is not associated with ptosis and tends to disappear with growth, whereas epicanthus inversus does not so disappear with growth.

Mann (1957)[16] stated that epicanthus and ptosis are frequently linked but classifies only three types of epicanthus, as follows:

1. Supraciliaris.
2. Palpebralis.
3. Tarsalis.

The fourth or inverted type as described by Duke Elder[17] and others is not mentioned, although again the illustrative photographs appear to be of this type.

Mann[16] classified ptosis into only two types, as follows:

1. The commonest type, in which the levator muscles, and sometimes the superior rectus muscles, are absent.

2. The type described as part of external ophthalmoplegia of central origin, often involving all of the extrinsic muscles.

Mann also stated that ptosis and epicanthus can occur in all degrees, either alone or associated with blepharophimosis, dystrophy of the puncta lacrimalis, abnormalities of the nose root and other anomalies.

Callahan[18] expressed the opinion that epicanthus inversus with blepharophimosis occurs more frequently than the literature would suggest.

O'Connor and McGregor (1953),[1] in an original attempt to classify this entity as a syndrome, described the clinical features in some detail. They appear to be the first to have suggested the presence of epicanthus inversus as an outstanding feature of the symptom complex.

It would appear, therefore, that the influence of heredity on blepharophimosis with ptosis, at least, is a constant factor. It is only with respect to the concomitant presence of the inverted type of epicanthus as a constant feature of these anomalies that there is division of opinion or no opinion at all.

On the basis of one of the longest family trees available, originally recorded by Dimitry (1921),[4] which the Owens-Meade Clinic has had the good fortune to observe over two additional generations, fortified by the cases of O'Connor and McGregor[1] and with what, in our opinion, is significant photographic evidence of the presence of epicanthus inversus in other reported cases (in which its presence was apparently not stressed by the author), we are convinced that this entity constitutes a true syndrome.

Genetic Background.—The Family Tree: After thirty-seven years the pedigree chart of Dimitry[4] (Fig. 1) has now been revised and extended (Fig. 1) to include persons numbered 25 to 43, with the exception of No. 30, a grandchild represented in the last generation (Fig. 2). Six affected persons occur among the 43 births since 1921. Our informers were unable to verify the birth or pathologic condition in 8 out of the 21 shown to be affected in Figure 2.

Figure 1 differs somewhat from Figure 2. No. 1 (Fig. 1) is the first affected female in Figure 2. According to Dimitry,[4] 2 of the 3 male offspring of No. 1 were affected and 1 was unaffected. No. 10, who is still living, claims that No. 3 once visited her husband (No. 8), and she remembers distinctly that he had "large eyes." Dimitry[4] does not indicate the sex of the offspring of No. 4. No. 22 was present at the wedding of No. 6, and he is certain that his aunt never had any offspring, although Dimitry[4] indicates that she had 3 affected offspring of unknown sex. No. 22 wrote a letter to one of his brothers who still lives in Italy, asking him to communicate with Nos. 16 and 17 for information about their branch of the family. Our informers are positive that No. 5 had only 3 offspring, not 6 as claimed by Dimitry.[4] No. 10, who is still living, does not understand why Dimitry[4] listed 4 unaffected daughters for her when she had 3. She did have an unaffected daughter from a previous marriage, who is not represented in Figure 1 or Figure 2. Although Dimitry[4] shows that No. 12 had four nonaffected female offspring, we are certain these 4 persons are male. The unaffected female who has 3 unaffected offspring of unknown sex, according to Dimitry,[4] must be No. 13. Numbers 9, 19, 21 and 30 (Figs. 3, 4, 5, 6) are the father, two daughters and a grandchild, whom we believe Dimitry[4] identified in his manuscript as his patients. His numbers (2, 3 and 6), which he used to identify the

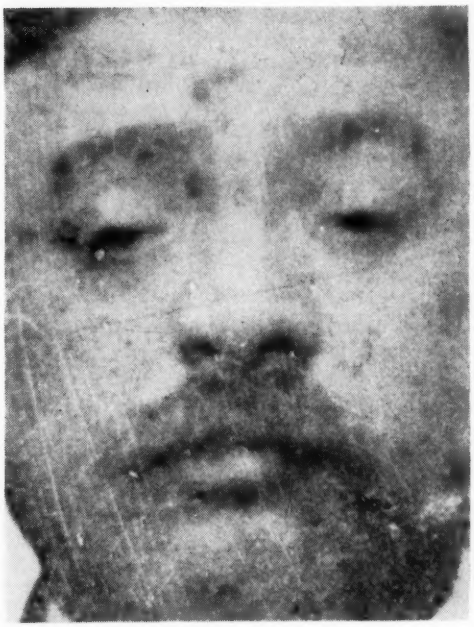

Fig. 3.—Relative No. 9 of revised pedigree.

Fig. 4.—Relative No. 19 of revised pedigree.

patients in his photograph from left to right, are numbers 19, 9 and 21 respectively on our chart (Figs. 7, 8 and 9).

The reader will have to judge which pedigree chart most accurately represents the true family relations. One would expect a chart prepared in 1921 to offer a more reliable representation of affected and unaffected members in former generations. In 1921, however, No. 22, who has been a primary source of information in our study, still resided in his native country, Italy. Even No. 80 seems to think that he has given more accurate information than was available when Dimitry[4] made his study.

The pattern of inheritance (autosomal dominant gene with one hundred per cent penetrance) is not changed by revision and extension of the pedigree chart originally prepared by Dimitry.[4] The fact that no unaffected persons occurred among the 10 offspring of Nos. 7, 9 and 30 seems unusual but must be due to chance.

Five affected fathers in our series produced 8 male and 13 female offspring. Six of the 8 male offspring and 7 of the 13 female offspring were affected. When these observations are combined with the observations from previously published pedigrees (sibships in which the sex of all offspring is indicated) by Usher (1925)[8] and Klein (1950),[19] affected or carrier fathers produced 55 male and 51 female offspring. Thirty-nine of the 55 male offspring and 29 of the 51 female offspring were affected. Thus 68 offspring of affected fathers were affected and 38 unaffected. This 68:38 ratio might be explained by failure to report all nonaffected offspring in some of the sibships. The fact that 24 affected or carrier fathers had offspring while only 7 affected and carrier mothers had offspring is noteworthy.

Although the distribution of the 106 offspring of these 24 affected or carrier fathers does not differ from the expected distribution, pairing of sibs within sib-

Fig. 5.—Relative No. 21 of revised pedigree.

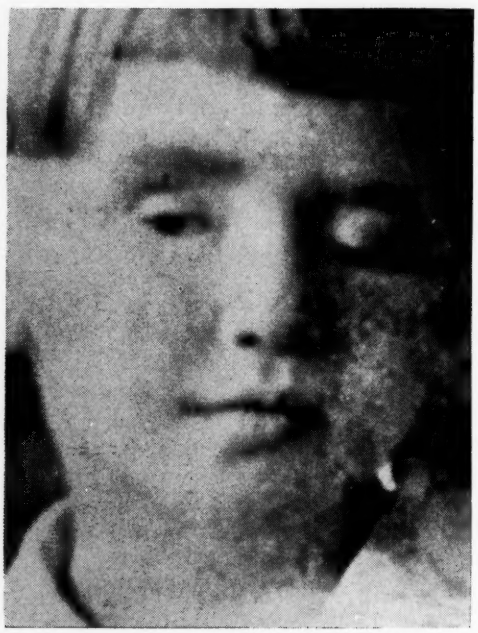

Fig. 6.—Relative No. 30 of revised pedigree.

ships shows a tendency for these offspring to be alike with respect to sex and the presence of syndrome ($X^2 = 4.7$). This correlation within sibships might be expected, were the gene for the syndrome to be located on a homologous portion of the X and Y chromosomes.

Four affected mothers in our series of kindred produced 8 male and 3 female offspring. Four of the 8 male offspring and 1 of the 3 female offspring were affected. When these observations are combined with published pedigrees (including only sibships in which the sex is given for each sib) by Usher (1925)[8] and Klein (1950),[19] 7 affected or carrier mothers produced 22 male offspring and 4 female offspring. Eleven of the 22 male offspring and 2 of the 4 female offspring were affected. Thirteen offspring were affected and 13 were unaffected. The available data are insufficient to indicate whether the distribution of offspring from an affected or carrier female parent differs significantly from the random expectation.

Embryologic Background. — According to Barber,[20] the epithelium of the lids originates from the ectoderm, whereas the lids proper are mesodermal in origin and paraxial, the lower lid being visceral.

During the first four weeks the ocular anlage is covered by a thin layer of sur-

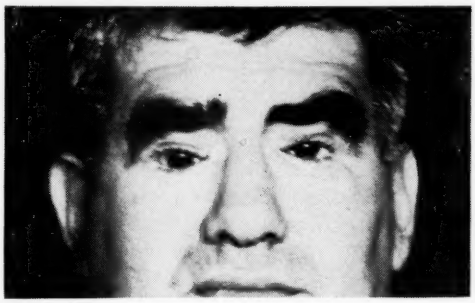

Fig. 7.—Relative No. 30 of revised pedigree as an adult (postoperative status); father of relatives Nos. 37, 38 and 39, all of whom represent continuation of Dimitry pedigree, now living and under observation.

Fig. 8.—Relative No. 37 of revised pedigree.

Fig. 9.—Relative No. 38 of revised pedigree.

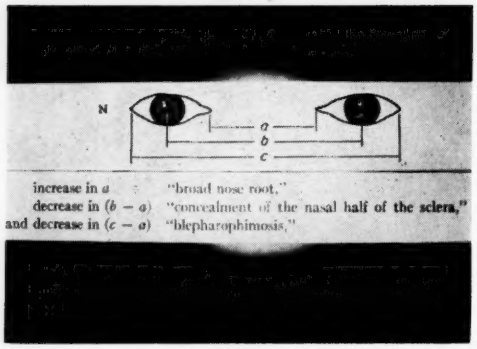
N
a
b
c
increase in a "broad nose root,"
decrease in (b − a) "concealment of the nasal half of the sclera,"
and decrease in (c − a) "blepharophimosis."

Fig. 10.—Illustration from Cotterman, Am. J. of Human Genetics, 3:257, 1951.

face ectoderm, and by the fifth week a fold begins to form in the mesoderm. At first it is circular with rounded margins, but as growth continues the upper and lower portions of the fold extend toward each other, meeting horizontally over the corneal region and thus producing lids.

At the ninth week (30 to 35 mm. stage), the lids come into contact and the epithelial surfaces become adherent, forming the inner and outer angles of the lids. Differentiation of the epithelial structures begins while the lids are sealed.

At the thirteenth week (52 mm. stage), near the fused portion of the outer angle of the lids, the ciliary follicles begin to develop from epithelial buds, which extend into the mesoderm. The upper cilia of the lid develop a little earlier than do those of the lower.

At the seventeenth week (80 mm. stage), the various glandular elements develop. The meibomian glands originate in pits at the posterior angle of the lid margins, growing into the mesoderm as solid columns of cells and later acquiring lumens and acini. The glands of Zeiss and Moll develop as outgrowths of the ciliary follicles. The lacrimal gland originates from six to eight epithelial buds separating from the epithelium of the upper and temporal sides of the conjunctiva. The conjunctiva itself is formed by the epithelium as the folds are developing and lines the inner portion of the lids and surface of the globe.

During the fourth month the orbit and contents assume their definite relations. The extrinsic muscles resemble those of the adult except in size, and the bony orbital wall is quite hard. All sheaths of the optic nerve are recognizable, and from this stage on the orbit and contents continue to grow in proportion to the fetus.

Mann[16] stated that the four recti and the two obliques should normally separate from their common mesodermal cone (annulus) at the 20 mm. stage.

The levator muscles are, however, the last external ocular muscles to form, beginning with the third month. In their fully developed state they arise medial to the superior rectus muscle from the lesser wing of the sphenoid and superior to the annulus at the apex of the orbit, fusing with the superior rectus. Both muscles are adherent medially by their fascial sheaths. As the levators course forward they normally fan out in a triangular fashion and end as thin, flat tendinous aponeuroses. The aponeurosis begins about 10 to 12 mm. above the upper margin of the tarsus.

By the seventh to eighth month the lids are open.

Normally the eye reaches adult size in the early twenties. The ratio of growth from birth to adulthood parallels that of the brain, being 3.25 for the eye to 3.75 for the brain, as compared to the body as a whole, which increases about twenty-one times.

At birth the globe has a vertical diameter of 13 to 16 mm. and a horizontal diameter of 15 to 19 mm. In adulthood the globe is more nearly spherical and averages 24 to 25 mm. in diameter. The cornea at birth is larger in proportion to the globe, measuring 9 to 10 mm. in diameter, and reaches adult size (11 mm. vertically

and 12 mm. horizontally) at the end of the second year. The orbital axis converges in the fourth month to form an angle of 55 degrees.

Anatomopathologic and Clinical Features.—Etiologically, therefore, the anomalies associated with this condition are basically due to apparent germinal arrest in the development of the lids and levator musculature, with some dysgenetic mechanism leading to the formation of epicanthus inversus, which itself is not apparent at birth but becomes evident at a later date. (This will be discussed later.)

As has been stated, the structures of the orbit, the globe and the extraocular appendages are well differentiated by the fourth month, so that any gross interference in normal development must presumably occur before this time.

Blepharophimosis.—Mann[16] stated that blepharophimosis, together with ankyloblepharon, represents an abnormal union of the lids and not merely persistence of the normal adhesion of fetal life; it is a true connective tissue and vascular union, and if the union is from the inner canthus outward it is ankyloblepharon, whereas if it is from outward to inward it is blepharophimosis, although their natures are the same. The condition is usually bilateral. Two theories are suggested as an explanation of the mechanism involved in the causation of these two anomalies:

1. Normal development of lid folds and apposition, with later mesoblastic union.
2. Abnormal subepithelial growth, the fissures being too short from the beginning.

The latter theory is considered the more plausible.

Rodin[12] stated that hereditary blepharophimosis has been reported of which the outstanding sign is narrowing of the palpebral fissure, and although, etymologically, the term means a contracted lid, it has

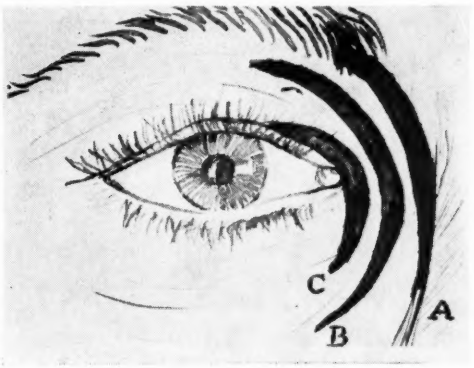

Fig. 11.—Composite line diagram of various types of medial epicanthus. *A*, epicanthus supraciliaris; *B*, epicanthus palpebralis; *C*, epicanthus tarsalis.

Fig. 12.—Commonest type of epicanthus (palpebral). After Callahan: Surgery of the Eye; Diseases. Springfield, Ill.: Charles C Thomas, Publisher, 1956, p. 22.

Fig. 13.—Typical epicanthus inversus. After Callahan: Surgery of the Eye; Diseases. Springfield, Ill.: Charles C Thomas, Publisher, 1956, p. 22.

Fig. 14.—Relative No. 39 of revised pedigree, 7 days of age, unable to open eyelids voluntarily (epicanthus inversus not apparent).

Fig. 15.—Relative No. 39 of revised pedigree, 6 weeks of age, unable to open eyelids voluntarily (epicanthus inversus still not apparent).

been accepted as meaning abnormal narrowing of the palpebral fissure.

Dimitry[4] did not classify the hereditary ptosis in his cases as true ptosis, since it was partially due to the mechanical effect of the phimosis.

Waardenburg (1951)[21] has shown, in normal adults of a mixed European population, the relation of medial intercanthal, interpupillary and outer intercanthal distances.

Cotterman (1951),[22] using Waardenburg's data, submitted a formula by which one may differentiate between a broad nose root, concealment of the nasal half of the sclera and "blepharophimosis" (Fig. 10). It does not follow, however, that clinical application of this formula to other nationalities or races, or to the young, would yield accurate results.

Normally the palpebral fissures in the adult, measured by air ruler projection with the eyes in the primary position of gaze, are 27 mm. horizontally and 9 mm. vertically.

The distance between the lid margin and the eyebrow in the young is normally 15 to 18 mm. In the presence of blepharophimosis with associated ptosis, as observed in cases of this entity, the palpebral apertures usually measure considerably less than normal, and the lid margin-to-eyebrow measurement is observed to be as much as 25 to 30 mm.

Von Ammon and Spaeth described blepharophimosis as an aplastic "malformation of faulty development," adding that because of this the upper lids "appear stiff and inelastic, the tarsal plates are shell-shaped with anterior convexity and a posterior vertical concavity curl resulting in an abnormal horizontal curve." The superior cul de sac is short.

O'Connor and McGregor[1] expressed the opinion that the palpebral defect is due to the epicanthus inversus, which results in shortening the horizontal measurement, the ptosis being responsible for the vertical narrowing.

Ptosis.—Owing to the germinal aplasia of the levator palpebrae superiores muscles, which presumably occurs prior to the fourth month, a true complete ptosis should result. The muscle is said to be thickened, fibrosed and inelastic. Johnson (1954)[15] stated that the ptosis bears no relation to derangement of nerve supply. This supposition is supported by the usual absence of other forms of external ophthalmoplegia in association with this condition. It should be mentioned that ptosis without a canthal defect (which does not apply to this entity) is, on the other hand, due to an oculomotor nerve defect and is nuclear rather than peripheral. It would

also follow, on the basis of embryologic development, that if the superior rectus muscle is anomalous the levator must also be deficient. Mann[16] stated that no known case has been reported of defective upward gaze with perfect movement of the lid. The levator bud may fail, however, without involvement of the superior rectus, which is the usual observation in study of this entity.

Because of the combined effects of blepharophimosis, ptosis and what clinically appears to be a diminution of areolar tissue of the lids and a thin, inelastic tarsus, the upper margins of the upper lids may appear flattened and indented, with loss of the tarsal and ciliary marginal skin folds normally present.

Meade[23] reported that in 1 case histopathologic sections of orbicularis oculi muscle fibers from the lower lid revealed definite fibrosis.

It has been reported that in extreme cases the upper and lower lid margins are dissimilar in iinear length, sometimes grossly, the upper lid margin assuming a gentle S curve and the lower being distorted at the outer half of a scaphoid concavity.

Normally, the upper eyelids lie midway between the limbus and the pupil, with the lower lid at the margin of the limbus, resulting, as has been stated, in a vertical aperture measurement of 9 mm. In this syndrome the upper lid may half cover the cornea, so that, in order to see, the head will be held back at an angle of 20 degrees or more, with the eyebrows arched and the forehead wrinkled to gain the effect of position and suspensory action of the frontalis muscle.

Epicanthus Inversus.—This feature was definitely present in 9 (4 in one family) of 68 cases reviewed, in all of which the patients had been seen with a presenting complaint of ptosis from 1941 to 1958 at the Owens-Meade Clinic.

Fig. 16.—Relative No. 39 of revised pedigree, 3½ months of age, beginning to elevate upper eyelids partially by use of frontalis muscle (epicanthus inversus now becoming apparent).

Fig. 17.—Relative No. 39 of revised pedigree, 3½ months of age. Eyelids being forcibly raised.

In all of the 9 cases of epicanthus inversus there were associated blepharophimosis and bilateral complete ptosis. The case of 1 of the remaining 59 patients with ptosis was considered as probably falling into this category, but photographs were considered inadequate for scientific publication. In 58 cases there were various degrees of ptosis, unilateral or bilateral, without blepharophimosis or epicanthus inversus. In 3 of the 9 definite cases there was an inadequate family history of the hereditary form, although this did not preclude the probability.

Fisher, Zuckerman and Douglas (1954)[28] stated that it is not unusual to find other anomalies associated with congenital ptosis, the most frequent being epicanthus. Unfortunately, again the type is not mentioned. Johnson (1954)[15] expressed the

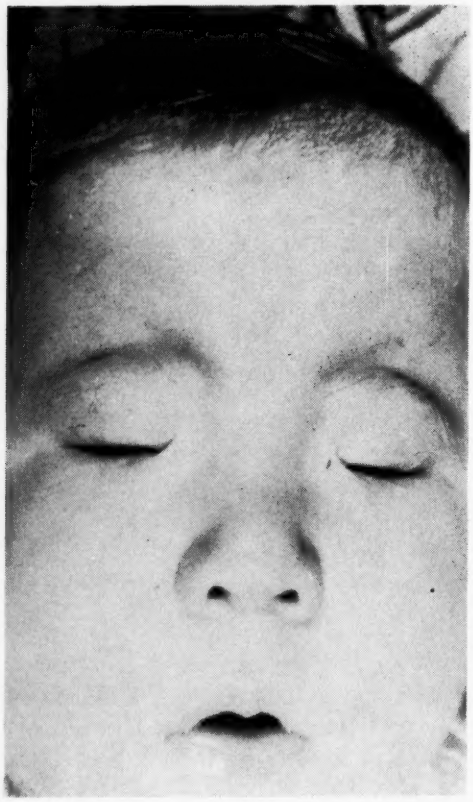

Fig. 18.—Relative No. 39 of revised pedigree, 6 months of age. Can now follow objects with aid of frontalis when attention is obtained (epicanthus inversus very definite).

conviction that epicanthus inversus is always associated with blepharophimosis, ptosis and hereditary causes.

To our knowledge, no satisfactory explanation has yet been offered as to the specific cause of the various types of epicanthus.

Duke Elder,[17] quoting Bolk (1922),[25] stated that epicanthus is due to simple arrest of development and is normal in all fetal forms and in the adult Mongol. The adult Mongol being merely a prolongation into adult life of a universal fetal stage (a hypothetical assumption, bearing some support (?), that the Gobi desert was the cradle of the human race). Von Ammon considered epicanthus due to excessive development of skin at the root of the nose. Sichel (1852),[25] Manz (1876)[26] and Chouke (1929),[27] however, ascribed it to abnormally poor development of the bony nasal radix.

Von Ammon gave credit to Braun for first describing epicanthus inversus and classified the various types as follows:

1. Supraciliaris: The fold originates in the eyebrow and extends to the bridge. This is the rarest form.

2. Palpebralis: The fold originates in the skin of the upper lid and tarsal fold and extends to the lower orbital region. This is the commonest form.

3. Tarsalis: The fold originates from the tarsal fold and continues to the lower orbital margin or inner canthus into the skin of the lower lid.

4. Inversus: The fold originates from the lower lid to encircle the uninvolved upper lid. The canthus is abnormally placed laterally, increasing the distance from the nose.

Duke Elder classified epicanthus as follows:

1. Supraciliaris: The fold extends from the eyebrow to the sac or nostril.

2. Palpebralis: The fold extends from the upper lid above the tarsal region to the lower margin of the orbit.

3. Tarsalis: The fold extends from the tarsal fold to the inner canthus.

4. Inversus: The fold extends from the lower lid upward to a laterally displaced inner canthus.

5. Lateralis: A vertical fold of skin of the outer canthal region, yet is postinflammatory and is also referred to as pseudo-epicanthus (traumatic).

It is usual for the first three types noted in these classifications to disappear as the nasal bridge develops at about the age of 12 years. Epicanthus inversus, however,

as has been stated, persists (Johnson and others).

A composite diagrammatic line drawing is presented to illustrate the various types of medial epicanthus, as well as photographs of the commonest (palpebral) type and the inversus type for comparison (Figs. 11, 12 and 13).

In following 1 of our patients from birth (Figs. 14, 15, 16, 17, 18, 19, 20 and 21), in whose case the entity was anticipated because of the familial diathesis, it was surprising to note that, although the infant was born with blepharophimosis and complete bilateral ptosis, as was borne out later, the expected epicanthus inversus was not apparent. By about the fourth month of age, however, it had become clinically noticeable. Our review of the literature discovered no reference to this singularly interesting fact.

Callahan[18] described two related conditions, which cannot be confused with epicanthus inversus but are mentioned for the sake of completeness:

1. Epiblepharon: This is characterized by a fold of skin running across the upper lid, frequently hanging over the lower part of the upper lid and continuous with epicanthus tarsalis, the two folds running down over the medial canthus to constitute a "Mongolian fold." Study of this

Fig. 19.—Relative No. 39 of revised pedigree, 16 months of age, with eyelids closed.

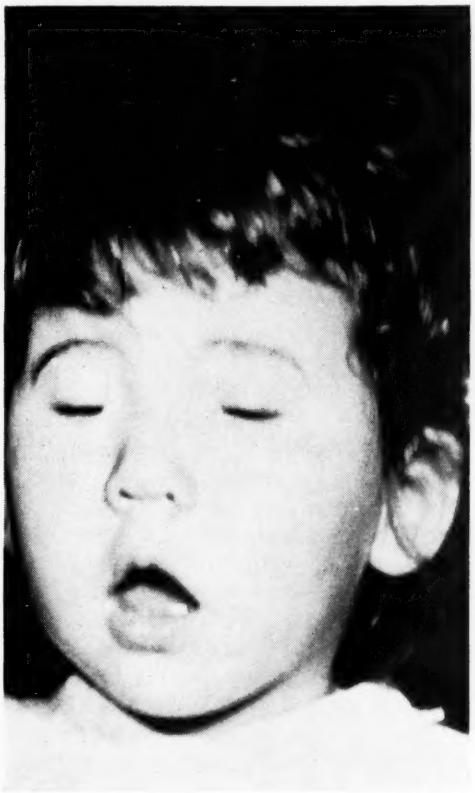

Fig. 20.—Relative No. 39 of revised pedigree, 16 months of age, attempting to raise eyelids by use of frontalis.

Fig. 21.—Relative No. 39 of revised pedigree, 16 months of age, assuming characteristic position of gaze with head held back.

anomaly in Mongols has shown that this is due to a Z-shaped kink in the fibers of the orbicularis muscle and that the insertion of the levator tendon is very near the lid margin, in contradistinction to that of the occidental, the insertion of which is mainly to the lower third of the tarsus and skin.

2. Epiblepharon Inferior: This is a similar fold of skin extending horizontally across the lower lid, yet is common in infants and almost invariably disappears before the end of the first year.

Associated Secondary Extraocular Anomalies.—Some of the following signs are consistently present but vary in degree with the severity of the anomaly.

Eyebrows: The following description has been offered by all those reporting on this condition: The supracilia are characteristically high-arched, particularly over their medial portions, being noticeably wider in this region as compared with the normal, a characteristic common to most cases of severe hereditary ptosis. The overall picture gives them the appearance of being placed high on the facial level. In the female, this may be made less noticeable by plucking. It has been stated that there is actual hyperplasia of the hair follicles.

Forehead: Owing to the dependence on the suspensory effect of the frontalis muscle, a noticeable hypertrophy is present, manifested by accentuation of the natural furrows.

Nasal Bridge: It has been reported by many authors that the nasal bridge is flattened and poorly developed; however, we have not found this to be the case.

The Orbit: In some authors' opinion there is an increase in the horizontal distance between the medial orbital walls, resulting in (along with the additional effect produced by the more laterally placed medial canthi) pseudohypertelorism. Certainly true hypertelorism does not exist if one applies the measurements of Waardenburg.[21] An increase in the distance between the medial orbital walls was not observed in the 21 cases reported by Dimitry.[4] Roentgenographic studies of 4 of our patients from the same family tree also indicate no aberration from the normal measurements.

The Globe: No cases have been reported in which abnormalities of the globe or its contents existed. Vision and fusion are likewise unaffected.

The Extraocular Muscles: Ophthalmoplegia is not a usual component of the entity, although it is possible on the basis that when embryonic arrest occurs, any accompanying paresis would necessarily involve primarily the superior rectus and perhaps the lateral rectus muscles.

The Palpebral Ligaments: It has been reported by most writers that the palpebral ligaments are elongated and stretched. Determining to what extent this occurs, however, is sometimes difficult. Hughes[11] stated that the normal medial canthus depression is lacking and the lower lacrimal puncta may be displaced so far laterally as to come to lie on a vertical line with the pupil. This may have some indirect relation to estimation of the ligamentous displacement. In our 9 cases the puncta have assumed a relatively normal position.

Other Associated Structures: The lacrimal apparatus and other glandular structures do not appear to be affected, nor do the cilia of the lids or the caruncle. Entropion or ectropion is not reported.

The Facies: Several authors describe the general conformation of the facies as of the brachyocephalic type, almost mongoloid, which may mislead the observer in interpretation of the patient's mentality. On the contrary, these persons are mentally quite normal. The question of whether this condition is limited to the "round head" or Mediterranean type must be considered.

SUMMARY

A triad of clinical observations, consistently manifested by blepharophimosis, ptosis and epicanthus inversus, as reported in the literature for more than a century in many family trees and referred to by various titles and classifications, is reviewed for consideration, as representing a true syndrome first suggested by O'Connor and McGregor.

The hereditary nature of this triad is further acknowledged by revision and extension of the original Dimitry pedigree after thirty-seven years and the addition of two generations including 6 affected persons in forty-three births since 1921.

The pattern of inheritance (autosomal dominant gene with 100 per cent penetration) is not changed after revision and extension of the original Dimitry pedigree.

The presence of epicanthus inversus as a singular feature of this anomaly, referred to by many authors as simply "epicanthus," is stressed.

Sixty-eight random cases are reviewed in which a presenting complaint of ptosis was made at the Owens-Meade Clinic from 1941 to 1958 and 9:68 had associated epicanthus inversus and blepharophimosis (4:9 were from one family; i.e., the Dimitry pedigree). Although there are no reliable statistics with regard to this triad, the 9:68 ratio is obviously high by chance.

Serial photographs are presented of 1 patient (kindred No. 39 of the revised Dimitry pedigree) from 7 days to 16 months of age, in which the extraocular anomaly was anticipated. That epicanthus inversus did not become clinically apparent until about the fourth month is noted as an observation of some interest.

The importance of recognizing the coexistence of these features, in planning their functional and cosmetic reconstruction, is emphasized. Particular consideration should be given to the nature of the ptosis and the specific type of epicanthus involved, since they do not lend themselves well to most methods of surgical repair.

ZUSAMMENFASSUNG

Eine Dreiheit klinischer Symptome bestehend aus Lidspaltverengerung, Ptose und Epicanthus inversus, über die seit mehr als hundert Jahren in der Literatur bei vielen Familien berichtet wird, und die unter verschiedenen Namen und Einteilungen erscheint, wird aufs Neue untersucht und als ein echtes Syndrom angesehen, wie es zuerst von O'Connor und McGregor vorgeschlagen worden war.

Der erbliche Charakter der Trias wird ferner durch Revision und Ausdehnung des ursprünglichen Dimitryschen Stammbaums nach 37 Jahren und durch die Hinzufügung von zwei Generationen, bei denen unter 43 Geburten seit 1921 sechs befallene Personen vorkamen, bestätigt.

Das Muster der Vererbung (autosomales dominantes Gen mit hundertprozentiger Penetration) ist nach Revision und Ausdehnung des ursprünglichen Dimitryschen Stammbaums unverändert geblieben.

Auf das Vorhandensein des Epicanthus inversus als eigentümliches charakteristisches Merkmal dieser Anomalie wird be-

sonderes Gewicht gelegt. Viele Verfasser bezeichnen den Epicanthus inversus einfach als "Epicanthus."

Es wird über 68 Fälle berichtet, die in den Jahren 1941 bis 1958 wegen Ptose in die Owens-Meadesche Klinik kamen. Bei neun von diesen bestand gleichzeitig ein Epicanthus inversus und Lidspaltverengerung (vier von diesen neun stammten aus einer Familie, nämlich dem Dimitryschen Stammbaum). Wenn auch noch keine zuverlässigen Statistiken über diese Trias vorliegen, so ist doch das Verhältnis von neun zu achtundsechzig offenbar hoch.

Es wird eine Serie von Photographien eines Patienten (Familienmitglied No. 39 des revidierten Dimitryschen Stammbaums) vom siebenten Lebenstage bis zum 16. Lebensmonat gezeigt, bei dem die extraokuläre Anomalie vorausgesehen wurde. Die Beobachtung, dass der Epicanthus inversus klinisch nicht vor dem vierten Lebensmonat in Erscheinung trat, ist interessant.

Die Wichtigkeit, das gleichzeitige Bestehen dieser charakteristischen Merkmale zu erkennen, wird hervorgehoben, weil der Plan eines funktionellen und kosmetischen Wiederaufbaues davon abhängt. Besondere Beachtung verdient die Art der Ptose und die spezifische Form des Epicanthus, weil diese für die meisten chirurgischen Verfahren nicht gut geeignet sind.

RESUMEN

Se refiere este trabajo a una tríada de observaciones clínicas manifiestas fundamentalmente por blefarofimosis, ptosis y epicanto inverso, como van siendo descritas en la literatura desde hace más de un siglo y con carácter familiar, con diversos nombres y clasificaciones que ahora son sometidos a estudio, por representar todas ellas un mismo síndrome descrito por primera vez por O'Connor y McGregor.

El carácter hereditario de esta tríada ha sido confirmado por la revisión y extensión del pedigree original de la familia Dimitry a lo largo de 37 años y la adición de dos generaciones que incluyen seis personas afectadas en 43 nacimientos desde 1.921.

La calidad hereditaria (gene dominante autosomático con 100% de penetración) no ha cambiado en la revisión y extensión del Dimitry original.

Se insiste en la presencia del epicanto incluso como una sola característica de esta anomalía, referida por muchos autores simplemente como "epicanto."

Se revisan 68 casos, que se presentaron aquejando ptosis en la Clínica Owens-Meade entre 1.941 y 1.958, nueve de los cuales tenían asociado epicanto inverso y blefamofimosis (4:9 eran de una familia, es decir: pedigree Dimitry). Aunque no hay estadísticas de confianza respecto a esta tríada, la proporción de 9 entre 68 es evidentemente alta.

Se presentan fotografías seriadas de uno de los enfermos desde los 7 días hasta los 16 meses de edad en las cuales se presiente la anomalía extraocular. Se hace notar con interés como el epicanto inverso no se hace patente hasta los 4 meses de edad.

Se insiste sobre la importancia de la coexistencia de las manifestaciones clínicas para planear la reconstrucción cosmética y funcional. Debe prestarse particular atención a la naturaleza de la ptosis y al tipo específico del epicanto ya que no se ajustan bien a la mayor parte de los métodos de cirugía reparadora.

SUMARIO

O A. faz uma revisão da triade clinica consistindo de blefaroptose, ptose e epicantus inversus relatada na literatura há mais de um século como pertinente a diversas familias e considerada por O'Connor e McGregor verdadeira sindrome por eles descrita.

Examina a questão da hereditariedade

em 37 anos e por duas gerações incluindo 6 pacientes em 43 nascimentos desde 1921.

A presença de epicantus como um aspecto particular dessa anomalia é salientada neste trabalho.

Sessenta e oito casos são revistos apresentando queixa de ptose de 1941 a 1958 revelando: 9.68 associação com epicantus e blefaroptose (sendo 4.9 n'uma so'familia). Apresenta fotografias em serie de um paciente de 7 dias a 16 mêses de idade no qual a anomalia extra-ocular foi antecipada. A importância de reconhecer a coexistência dessas anomalias é salientada em termos de resultados funcionais e esteticos.

Afirma a importancie em verificar a naturesa e o tipo de ptose e do epicanto uma ves que nem todos os metodos cirurgicos se ajustam a todos os casos.

RÉSUMÉ

Une triade d'observations cliniques se traduisant uniformément par un blépharophimosis, une ptose et un épicanthus inversus—telles que les rapporte la littérature depuis plus d'un siècle dans de nombreux arbres généalogiques et auxquelles se réfèrent de nombreux titres et classifications—sont passées en revue et proposées à l'étude comme représentant un syndrome véritable suggéré pour la première fois par O'Connor et McGregor.

La nature héréditaire de cette triade symptomatique est de plus reconnue par la révision et l'extension du pédigrée original de Dimitry après 37 ans, et l'adjonction de deux générations comprenant 6 personnes sur 43 naissances repuis 1921.

Le schéma de l'hérédité (gène autosome dominant avec 100% de pénétration) n'est pas modifié après révision et extension du Dimitry original.

La présence d'un épicanthus inversus, trait singulier de cette anomalie memtionée par de nombreux auteurs simplement comme "épicanthus," est soulignée.

Soixante-huit cas de la Owens-Meade Clinic de 1941 à 1958 sont révisés comprenant un cas de ptose, et 9:68 un épicanthus inversus associé à un blépharophimosis (4:9 de la même famille; c'est-à-dire: pédigrée de Dimitry). Bien qu'il n'y ait pas de statistiques sûres concernant cette triade, la proportion de 9:68 représente un pourcentage de probabilité élevé.

Des photographies en série sont présentées d'un malade apparenté au No. 39 du pédigrée de Dimitry révisé, depuis le 7e jour après sa naissance jusqu'au 16e mois, et où l'on s'attendait à trouver cette anomalie extraoculaire. Ce cas, où l'épicanthus inversus n'est pas devenu cliniquement apparent avant le 4e mois, est noté comme étant une observation présentant un certain intérêt.

L'importance de reconnaître la coexistence de ces caractéres pour l'établissement du programme de reconstruction fonction nelle et cosmétique est soulignée. Une attention spéciale devrait être accordée à la nature de la ptose et au type spécifique d'épicanthus impliqué, étant donné qu'ils ne se prêtent pas bien à la plupart des méthodes de réparation chirurgicale.

REFERENCES

1. O'Connor, G. B., and McGregor, M. W.: Associated Congenital Abnormalities of the Eyelids and Appendages (Syndrome), J. Plast. & Reconst. Surg. 11:348-352, 1953.
2. Ammon, V.: Klin. Dorstellungern d Kranke d Auges n.d. Augenlider, Berlin, 1841.
3. Komoto, J.: Ueber die Operation bei Hereditärer Phimosis congenita mit Ptosis (Nippon Gangakai Zasti, Juli-Dez., 1920), Klin. Med. 46: 952, 1921.
4. Dimitry, T. J.: Hereditary Ptosis, Am. J. Ophth. 4:655, 4656-5195, 1921.
5. Braun, G.: Eine besondere Form des Epikanthus mit kongenitaler Ptosis, Klin. Med. 68:110-120, 1922.
6. Franceschetti, A.: Die Vererbung von Augenleiden, Kurzes Hb. d. Ophth. 1:677-678, 1930.
7. Johnson, C. C.: Operation for Epicanthus and Blepharophimosis; Evaluation and Method for Shortening Medial Canthal Ligament, Am. J. Ophth. 41:71-79, 1956.
8. Usher, Ann. Eugenics 1:129, 1925.
9. Cockayne, E. A.: Epicanthus and Bilateral Ptosis, Proc. Roy. Soc. Med. 24:847, 1931.
10. Ross, N.: Congenital Epicanthus and Ptosis Transmitted Through 4 Generations, Brit. M. J.

1:378, 1932.
11. Hughes, W. L.: Surgical Treatment of Congenital Palpebral Phimosis, Arch. Ophth. 54:586-590, 1955.
12. Rodin, F. H., and Barkan, H.: Hereditary Congenital Ptosis: Report of a Pedigree and Review of the Literature, Am. J. Ophth. 18:213, 1935.
13. Aebli, R.: The Relationship of Pseudoptosis to Muscle Tropias and the Palpebral Aperture, Tr. Am. Ophth. Soc. 48:335-352, 1950.
14. Berke, R. N.: Surgical Correction of Blepharoptosis, Am. J. Ophth. 36:765-776, 1953.
15. Johnson, C. C.: Blepharoptosis: A General Consideration of Surgical Methods with Results in 162 Operations, Am. J. Ophth. 38:129-162, 1954.
16. Mann, I.: Developmental Anomalies of the Eye. Philadelphia: The J. B. Lippincott Company, 1957. 2d ed.
17. Duke-Elder, S.: Textbook of Ophthalmology. St. Louis: The C. V. Mosby Company, 1952, vol. 5, pp. 4640-4658.
18. Callahan, A.: Surgery of the Eye: Diseases. Springfield, Ill.: Charles C Thomas, Publisher, 1956, p. 22.
19. Klein, M.: Hereditary Bilateral Ptosis and Blepharophimosis Associated with Other Developmental Abnormalities of the Outer Eye, Proc. Roy. Soc. Med. 43:1025-1026, 1950.
20. Barber, A. N.: Embryology of the Human Eye. Springfield, Ill.: The C. V. Mosby Company, 1955.
21. Waardenburg, P. J.: A New Syndrome Combining Developmental Anomalies of the Eyelids, Eyebrows and Nose Root with Pigmentary Defects of the Iris and Head Hair with Congenital Deafness, Am. J. Human Genetics 3:3, 195-249, 1951.
22. Cotterman, C. W.: Some Statistical Problems Posed by Waardenburg's Data on Dystopia Canthorum and Associated Anomalies, Am. J. Human Genetics 3:254-266, 1951.
23. Meade, R. J.: The Owens-Meade Clinic, New Orleans; personal correspondence.
24. Bolk: Ned. Tij. Gen. 2:1536, 1922.
25. Sichel: Jahrb. f. Kinderh. 18:1, 1852.
26. Manz, G. S.: Hb. 112:107, 1876.
27. Chouke: Am. J. Phys. Anthrop. 13:255, 1925.
28. Fisher, B.; Zuckerman, G. H., and Douglas, R. C.: Combined Inheritance of Purpura Simplex and Ptosis in 4 Generations of One Family, Blood 9:1199-1204, 1954.

The qualified doctor can embrace the whole of medicine in his work, choose one of its larger subdivisions, or confine his outlook to one limited aspect. He can work alone, in double harness, or as a member of a team. He can take the risks and savour the delights of individual enterprise, or seek the secure tramlines of whole-time salaried employment with an ultimate pension. Should he turn to the plum stones for guidance, he will find that soldier, sailor, rich man, poor man, apothecary, thief, are all open to him. . . . And in all activities his training is with him as an interest and a permanent background, offering him further opportunities should those he first embraced prove illusory, and a certain, if meagre, livelihood under all conditions. One career cut short by accident or disease, he can, in middle age, find another of equal interest and scope. He can satisfy his own aspirations and play a part useful to his fellow men far beyond the age which closes other careers.

—Ogilvie

Proctologic Surgery

Fluid Balance in the Management of Ileostomy

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IN order to provide proper management of the problems of fluid balance that may arise after the creation of an ileostomy, it is necessary to understand not only the normal preoperative physiologic picture but the changes in body function that normally follow any major surgical procedure.

It is the purpose of this paper to discuss briefly some of the changes that occur both before and after the creation of an ileostomy for the relief of ulcerative colitis. Ileostomy, with or without colectomy, obviates none of the electrolyte hazards except those due to bleeding into the large bowel.

Preoperative Considerations.—Preoperatively, several factors influencing the postoperative values of fluid and electrolytes should be recognized. These factors are (1) the state of hydration, (2) renal function, (3) the circulating blood volume, (4) the concentration of blood ions and (5) nutrition.

Hydration: Normally, body water may be calculated at about 60 per cent of the body weight, 40 per cent being intracellular, 15 per cent extravascular and 5 per cent existing in the plasma. Between 800 and 1,200 cc. of urine is usually excreted within twenty-four hours.

Dehydration should, of course, be corrected preoperatively, since electrolyte values will otherwise be altered and postoperative difficulties increased.

Renal Function: Under physiologic conditions, the kidneys will excrete excessive extracellular water and will conserve water when the fluid intake is low. In addition, they will regulate the acid-base balance of the body by conserving or excreting the sodium ion and will retain water when the sodium concentration is increased.

The normal kidney also excretes 25 to

Since it is the patient's disease rather than his blood chemical levels that should be treated, adequate replacement therapy depends on knowledge of those levels before the operation, the amount of blood lost during the operation and the correct postoperative tabulation of intake and output. Water, blood and electrolytes should be replaced, rather than improved upon, after surgical intervention. Preoperative appraisal of the patient's renal function, cardiovascular condition and state of hydration is most important. Once a base line has been ascertained, and if surgical principles are adhered to before and after the operation, fluid and electrolyte therapy is not necessarily difficult or mysterious.

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60 mEq. of potassium daily and will increase its output when 10 per cent dextrose is administered.

Renal abnormality may be suspected when less than 500 cc. of urine is excreted within twenty-four hours after the intake of 1,000 cc. or more of fluid. A fixed specific gravity of 1.010 or less and the presence in the urine of cells and casts, as well as proteinuria and an elevated nonprotein nitrogen level in the blood, furnish further evidence of impaired renal function. If the intravenous administration of 1,000 cc. of 5 per cent dextrose in water during one hour is accompanied by the passage of less than 25 cc. of urine within the same hour, it may be concluded that renal function is impaired.

Circulating Blood Volume: Several tests exist that will ascertain the circulating blood volume if this is deemed necessary. Diminished blood volume should be restored preoperatively by means of transfusion. For patients with arteriosclerosis, however, replacement therapy should be slow in order to avoid overloading the circulation, since the consequence of this may be right heart failure.

Ionic Concentrations: It is probably preferable to record ionic concentrations in milliequivalents rather than in milligrams per hundred cubic centimeters, because of the convenience of working with units that are quantitatively interchangeable.

Sodium is the dominant ion in the extracellular fluid, and as a rule the level of sodium in the blood will reflect the concentration of this ion in the extracellular space. The normal range is 135 to 145 mEq. per liter; levels of over 145 mEq. per liter are rarely observed. A low preoperative sodium level may indicate overhydration, excessive extracellular loss or a renal defect; sodium levels below 120 mEq. per liter are serious and may cause disorientation. A renal defect may be due either to disease or to decreased circulating cortisone, which normally tends to retain sodium in the blood stream.

Sodium is excreted in the urine in amounts of 80 to 200 mEq. per liter daily. If more is excreted, renal dysfunction is again to be suspected.

Potassium is the dominant intracellular ion and exists normally in concentrations of 145 to 150 mEq. per liter in the cell and 4.5 mEq. per liter in plasma. Decreased potassium levels in the blood stream will cause weakness and malaise.

The chloride ion occurs in the plasma in concentrations of 98 to 106 mEq. per liter. Vomiting in particular may lead to decreased chlorides and metabolic alkalosis.

Bicarbonate levels are controlled both by the kidneys and by the respiratory apparatus and constitute the first line of defense against changes in the acid-base balance. Conservation of the bicarbonate ion raises the carbon dioxide combining power of the blood and, together with alkaline urine, indicates metabolic alkalosis.

As yet, improved nutrition by artificial anabolism is not feasible, but the ingestion of 50 to 100 Gm. of dextrose daily will spare some protein catabolism. Protein is best absorbed by the alimentary tract and is provided most satisfactorily in the form of lean meat. Patients who cannot eat should receive plasma or blood as an aid in maintaining osmotic pressure. This, in turn, helps to keep the body water in its proper tissue compartments.

Postoperative Considerations. — After the operation knowledge of normal postoperative physiologic changes becomes important. These changes can be summarized briefly as follows:

1. Slight elevations of temperature and pulse occur normally and are due partially to interference with heat loss.

2. A decrease in the excretion of urine, accompanied by sodium retention, is noted

TABLE 1.—*Expected Daily (Twenty-Four Hour) Values of Fluids and Electrolytes in Patients with Ulcerative Colitis without Cortisone Therapy*

	Normal	*Active Colitis or Diarrhea*	*Ileostomy Immediately After Operation*	*Ileostomy Established*
Volume	Varies	Increases	1,000-3,000 cc.	500-1,000 cc.
Nitrogen	1 Gm.	8 Gm.	2 to 4 Gm.	1 to 2 Gm.
Sodium	150 mEq./L	150 mEq./L	200 to 400 mEq./L	150 mEq./L
Potassium	10 mEq./L	30 mEq./L	5 to 10 mEq./L	10 to 20 mEq./L
Calcium	4 to 8 Gm. (50 to 60 mEq./L)	4 to 8 Gm. (50 to 60 mEq./L)	20 to 50 mEq./L	50 to 100 mEq./L

TABLE 2.—*Expected Daily (Twenty-Four Hour) Levels of Fluids and Electrolytes in Patients with Ulcerative Colitis with Cortisone Therapy*

	Normal	*Active Colitis or Diarrhea*	*Ileostomy Immediately After Operation*	*Ileostomy Established*
Volume	Decreases	Decreases	Decreases	Decreases
Nitrogen	Decreases with volume	Decreases with volume	Decreases with volume	Decreases with volume
Sodium	Decreases	Decreases	Decreases/L	Decreases/L
Potassium	Varies	Varies	Increases/L	Increases/L
Calcium	Decreases with volume	Decreases with volume	Decreases with volume	Decreases with volume

for about two days and is followed by sodium diuresis. Some consider this retention of water due to a hypothalamic and pituitary mechanism with release of an antidiuretic hormone. The retention of sodium is probably due to increased adrenocortical activity, as indicated by the increased excretion of corticosteroids in the urine and sometimes by a drop in the number of circulating eosinophils.

3. Surgical trauma impairs the ability of the kidneys to retain potassium, which is lost in the urine for two to five days after the operation. Blood levels do not change appreciably during the period, but as much as 50 per cent of the potassium given intravenously may be excreted. Dehydration causes potassium and water to pass from the cell into the depleted extracellular space, and when fluids are subsequently given diuresis occurs, with the loss of large amounts of potassium.

4. Nitrogen is lost for three to seven days after the operation, after which time a positive nitrogen balance is usually reestablished.

5. Owing probably to adrenocorticosteroid influence on the permeability of cell membranes, there is normally a postoperative increase of extracellular fluid volume and a decrease in intracellular fluid volume. The increased production of ACTH also decreases gastric secretions and increases the urinary creatinine content, possibly as a result of increased muscle metabolism.

6. The ileostomy that has been created may also function peculiarly for a time.

In Table 1 are listed some of the changes that may occur in the newly established ileostomy.

It will be noted that the volume of ileostomal excretion in the immediate postoperative period is about 1,000 to 3,000 cc. per day. After the ileostomy has matured, 500 to 1,000 cc. daily is a usual amount.

Nitrogen is normally excreted in the amount of 1 Gm. per day in the stool, although in the presence of the diarrhea associated with active ulcerative colitis the nitrogen loss in the stool may reach 8 Gm. Ordinarily, 2 to 4 Gm. is discharged daily from a newly created ileostomy, but this value will decrease to the norm of 1 Gm. after the ileostomy has become established.

About 10 mEq. per liter of sodium is excreted normally in the stool; this excretion will increase in the presence of diarrhea only in relation to the volume of stool expelled. From the newly created ileostomy stoma, however, 200 to 400 mEq. per liter will be excreted. This is a usual phenomenon but must be taken into consideration in calculating replacement therapy. Once the ileostomy has matured, the excretion will approach that normally observed in the stool.

Except on a volume basis there is no immediate postoperative increase in the normal excretion of potassium, which amounts to about 10 mEq. per liter of stool. In the presence of the matured ileostomy, however, discharge of potassium may increase up to 20 mEq. per liter.

Calcium, chloride and bicarbonate levels in the stool are not changed appreciably except on a volume basis.

Table 2 shows the effect on volume and electrolyte content of the stool after the administration of cortisone. It will be noted that the administration of cortisone decreases both the excretory volume of fluid and the concentration of electrolytes. This holds true also with the matured ileostomy. Sodium excretion is not only decreased throughout but is excreted in lesser concentration.

Preoperatively, potassium varies in concentration with the administration of cortisone, but the concentration increases after the formation of an ileostomy. This elevation will persist while cortisone therapy is continued.

Calcium excretion will decrease in proportion to volume decrease.

Postoperative Replacement of Fluids and Electrolytes.—Hydration: Intake and output of fluids must be recorded in order to determine the amount of water that requires replacement. Eight hundred to 1,000 cc. a day will be lost insensibly in sweat and through the lungs. This amount, plus the other known elements of fluid excretion, should be replaced. Overhydration is an ever-present danger for the first two postoperative days, owing to the normal decrease in urinary output. This may be checked by daily weighing of the patient; if less than 200 Gm. of weight is being lost each twenty-four hours, overhydration may be suspected.

Severe nitrogen losses may be ameliorated by transfusion of blood and the administration of amino acids. A positive nitrogen balance will return after the patient begins to assimilate food through the alimentary tract.

Seventy to 80 mEq. per liter of sodium will be excreted in the urine daily in addition to the 300 mEq. per liter lost through the ileostomy, and this total should be replaced. There is approximately 145 mEq. of sodium in a liter of physiologic solution of sodium chloride. Therefore, in order to replace adequately the sodium lost through the ileostomy, it may be necessary at times to give sodium chloride in a greater concentration in order to prevent overhydration.

Potassium replacement is not usually a problem, because only 30 to 40 mEq. per liter is lost daily in the urine and the

ileostomy drainage combined. Replacement of 30 to 45 mEq. per liter of potassium per day is adequate. This corresponds to about 3 Gm. of potassium chloride, which may be added to an infusion.

No calcium replacement need be considered unless extensive fluid loss occurs from the ileostomy. Calcium may then be replaced orally or with calcium gluconate.

Chloride and bicarbonate ions should be replaced by Ringer's or Hartmann's solution as indicated. With good renal function and proper replacement of base, and in the absence of excessive loss of gastric contents, replacement of these ions does not usually become a problem.

Blood should be replaced volume for volume. No immediate attempt should be made to correct anemia unless it is due to loss of blood, which may be ascertained by means of daily hematocrit readings.

Normally, 1,000 to 2,000 cc. of fluid will be discharged from a newly created ileostomy during a period of twenty-four hours. Ileostomy diarrhea is a serious complication and usually reflects a functional obstruction. While the obstruction is being alleviated, replacement of sodium is urgent if adequate potassium intake is to be assured. If excessive sodium loss occurs, a salt depletion syndrome may appear, with prostration and shock. At this time it is necessary to administer 3 per cent sodium chloride in amounts of 500 cc. to correct the imbalance. Care must be taken to auscultate the chest frequently, in order to detect possible pulmonary edema.

ZUSAMMENFASSUNG

Der Verfasser weist darauf hin, dass man die Krankheit des Patienten und nicht seine chemischen Blutwerte behandeln muss. Angemessene Ersatztherapie hängt von dem Vertrautsein mit den Blutwerten des Kranken vor dem chirurgischen Eingriff, mit dem während der Operation erlittenen Blutverlust und mit den genauen Werten der Aufnahme und Ausscheidung nach der Operation ab. Die Menge an Wasser, Blut und Elektrolyten soll nach der Operation *ersetzt* und nicht verbessert werden. Die Auswertung des Wasserhaushalts, der Nierenfnuktion und des Zustandes des Kreislaufsystems des Kranken vor der Operation ist ässerst wichtig. Wenn auf diese Weise eine Basis für die Behandlung gewonnen ist, und wenn man sich vor und nach dem chirurgischen Eingriff an die Grundsätze der allgemeinen Chirurgie hält, braucht die Flüssigkeits- und Elektrolytenbehandlung nicht schwierig oder mysteriös zu sein.

RÉSUMÉ

C'est l'affection d'un malade, plutôt que les valeurs chimiques de son sang, qui devrait être traitée. Une bonne thérapeutique de substitution dépend de la connaissance des valeurs sanguines avant l'intervention chirurgicale, des pertes de sang subies durant l'opération et de la bonne distribution post-opératoire de l'apport et du débit. L'eau, le sang et les électrolytes devraient être *remplacés* au stade post-opératoire plutôt qu'améliorés. L'appréciation post-opératoire de l'état d'hydratation du malade, de la fonction rénale et de l'état cardiovasculaire est des plus importante. Une fois que la ligne de base est précisée et que les principes chirurgicaux sont appliqués avant et après l'opération, la thérapeutique liquide et électrolytique ne présente pas nécessairement de difficulté ni de problème.

RESUMEN

Debe aplicarse el tratamiento a la enfermedad del enfermo mas bién que a los valores químicos hemáticos. El reemplazo terapeútico depende del conocimiento de

los valores hemáticos antes de la intervención quirúrgica, de las pérdidas de sangre durante la operación y de la estimación correcta de los injesta y los excreta durante el postoperatorio. Después de la intervención deben reemplazarse mas bién que sobreañadirse el agua, la sangre y los electrolitos.

Es de la mayor importancia antes de someter un enfermo al acto quirúrgico formar un juicio exacto del estado de hidratación, de la función renal y del funcionalismo cardio-vascular. Un avez que se tenga un conocimiento exacto de los valores del enfermo antes de la operación y siguiendo bién las normas fundamentales durante esta y en el postoperatorio el empléo de fluidos y de electrolitos no resulta necesariamente una práctica dificil o misteriosa.

SUMARIO

A doença do paciente mais que sua bioquimica deve ser tratada. A terapêutica de substituição depende de um completo conhecimento dos valores sanguineos antes da operação, perda durante o ato operatorio e avaliação correta do balanço liquido. Agua, sangue, e eletrolitos devem ser repostos no posoperatorio. A hidratação, função renal e situação cardiovascular são muito importantes no pre-operatorio.

Nausea and vomiting were associated for thousands of years with seafaring, hardly ever with land journeys. Seasickness overtook Ulysses and his companions in the Homeric saga; it was a scourge to the Spanish *Conquistadores* when their proud boats sailed uncharted seas; it laid low the Portuguese heroes who first circumnavigated the globe; and it continues to vex those who, through necessity or pleasure, cross the seas in modern transatlantic liners.

Since literature and history record so few instances of motion sickness overtaking horsemen—no matter how distant, fast, or exhausting their travels—we cannot subscribe to the ancient theory that nausea is caused by mere visceral displacement. It is possible, however, that the men who rode on the backs of the lurching elephants responsible for Pyrrhus' victories suffered from motion sickness. The men who rode the camels—the ships of the desert—led by Colonel T. H. Lawrence during his famous rebellion in Arabia Deserta, told of the nausea that overtook them on the shifting hot sands so reminiscent of a vast gray sea.

At the beginning of our century, man, who had moved horizontally for several millenia, decided to attempt the conquest of vertical space. The great motility of airplanes added new violence to motion sickness and made this condition a tremendous problem particularly in countries—in some South American countries, for instance—where there has been a sudden transition from mule to plane.

—Marti-Ibañez

La Chirurgie de la Sciatique Discale d'apres Environ 2,000 Cas Operes

(The Surgical Treatment of Discal Sciatica, on the Basis of Approximately 2,000 Operative Cases)

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After twenty years' experience and 2,000 or more operations, the author presents the various investigations that guide him in the treatment of discal sciatica. Surgical intervention for discal sciatica is not the rule, but it has produced satisfactory results. In most cases the decision to operate can be made on the basis of clinical information, but in some cases roentgen examination is necessary. The operation is simple and requires only local anesthesia, and the results are usually rapidly evident, efficacious and permanent even in cases of severe involvement.

UNE pratique longue de 20 ans de la chirurgie de la sciatique discale, pratique qui porte à l'heure actuelle sur environ 2000 cas opérés, et un nombre bien plus considérable de malades observés aux différentes phases de leur maladie, souvent traités par d'autres méthodes, nous permettent d'apporter quelques réflexions d'expérience sur ce problème.

Contrairement à ce qui se produit pour beaucoup de thérapeutiques qui connaissent une période d'engouement extraordinaire, suivie d'une phase de déception et d'abandon plus ou moins complet, on peut dire que la chirurgie de la sciatique a maintenu les positions extrêmement solides qu'elle s'est acquises à partir du moment où l'on a pu mettre en évidence le rôle quasi constant de la hernie discale dans la genèse de la sciatique mono-radiculaire rebelle ou récidivante.

Cette affection est tellement stéréotypée dans son histoire clinique, son évolution, son tableau symptomatologique, que le plus souvent, pour qui a une certaine expérience de la chose, le diagnostic le plus précis, y compris celui de la localisation, peut être posé par le *simple interrogatoire*. Un *examen clinique* limité à la recherche de quelques signes essentiels vient confirmer les données de l'interrogatoire; la *radiographie* sans préparation reste indispensable pour le diagnostic différentiel en permettant d'éliminer le plus souvent les autres causes possibles de sciatique. Elle n'apporte, par contre, aucun élément indiscutable au diagnostic positif. L'utilisa-

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tion des *méthodes de contraste* n'est que très exceptionnellement nécessaire alors qu'au début de la chirurgie de la sciatique elle apparaissait indispensable. Enfin, la *technique opératoire* s'est simplifiée et à l'heure actuelle nous considérons la chirurgie de la sciatique comme une chirurgie qui est et doit rester bénigne et simple, n'imposant qu'un minimum d'immobilisation au malade à condition que les indications en soient correctement posées et la technique bien précisée.

Nous voudrions donc dans ces quelques notes exposer les données de notre expérience sur l'étude clinique, le diagnostic et le traitement chirurgical de la sciatique par hernie discale.

1. *L'Histoire et le Tableau Clinique.*— *La crise* de sciatique discale a presque toujours une évolution caractéristique: déclanchement spontané ou par lumbago d'effort, évolution rapide vers un maximum douloureux qui généralement immobilise le malade pendant quinze à vingt jours au lit avec des douleurs cruelles au moindre mouvement ou aux efforts classiques (toux, éternuement, défécation): certaines positions antalgiques peuvent rendre supportable cet état qui nécessite souvent l'administration de calmants.

Puis, peu à peu, les douleurs s'atténuent, la station debout redevient possible, mais la crise s'étalera encore sur plusieurs semaines et dans la moyenne des cas, la durée habituelle dc l'épisode sciatalgique est d'environ trois mois jusqu'à la guérison plus ou moins complète.

Cet *épisode sciatalgique* lorsqu'il est le premier est généralement précédé par un *passé lombalgique* qui peut être fort ancien et qui est caractérisé lui-même par des épisodes de "blocage" lombaire, de durée variable, mais qui laissent prévoir l'évolution de la discopathie vers la hernie discale proprement dite. Souvent aussi quand le chirurgien voit pour la première fois le sciatalgique, celui-ci a déjà eu une ou plusieurs crises de sciatique et il sera important de faire préciser leurs modalités pour le diagnostic précis de la lésion en cause.

Le malade vu en pleine crise présente, bien entendu, le tableau tout à fait classique sur lequel il n'est pas utile d'insister: scoliose en baionnette avec rigidité lombaire totale, douleurs traçantes sur le territoire de L-5 S-I, signe de Lasègue très franchement positif.

Quelques nuances séméiologiques permettent déjà de préciser la topographie. Certaines sont tout à fait classiques aussi: le siège même de la douleur mais surtout celui des troubles hypoesthésiques (bord externe du pied ou simplement malléole externe pour la *racine S-I*, bord interne du pied ou hypoesthésie globale en chaussette pour la *racine L-5*). L'abolition du réflexe achilléen, l'atrophie importante de la fesse et du mollet, les sensations hypo-thermiques et l'hypo-tonicite musculaire sont de bons signes de l'atteinte de S-I et nous parlons quelquefois de la "triade des hypos" (hypoesthésie, hypothermie et hypotonie musculaire) comme d'un indice valable de localisation S-I. L'hypothermie est d'ailleurs subjective (sensation de froid) mais peut être objectivement décelée par la simple palpation.

Par contre, la notion de *sciatique bilatérale à bascule* est à peu près exclusivement l'apanage de l'atteinte du disque L-4 L-5 et par conséquent de la compression de la racine L-5. Cette localisation s'accompagne souvent d'un syndrome lombalgique plus rebelle et plus ancien, plus caractérisé aussi que l'atteinte du disque L-5 S-I. A l'examen on trouvera souvent dans cette localisation un signe de Lasègue controlatéral, c'est à dire le réveil de la douleur dans le membre atteint par la recherche du signe de Lasègue du côté opposé, constatation exceptionnelle dans le cas de sciatique S-I.

C'est aussi dans cette localisation L-4 L-5 que l'intervalle qui sépare les crises reste grevé de quelques troubles mineurs surtout d'origine proprement vertébrale;

citons, en particulier, cette impossibilité de rester longtemps assis dans la même position, que nous appelons parfois le "signe du cinéma" qui interdit au malade d'assister à un spectacle un peu long, de conduire longuement une automobile, ou même dans les formes les plus marquées de prendre ses repas assis (la malade mange parfois debout, sur le coin de sa cheminée).

2. *La Radiographie.*—On ne se lassera jamais de dire que la *radiographie sans préparation* ne donne que très rarement des signes caractéristiques de l'existence d'une hernie discale. Tout au plus peut-on parler de présomption devant un pincement unilatéral ou global du disque L-4 L-5, non associé à d'autres altérations. Il faut être très prudent dans l'appréciation de l'état du disque L-5 S-1: rien n'est plus variable en effet, même chez des individus normaux que l'épaisseur de ce disque et il parait très abusif de parler de pincement ou de diminution de hauteur alors qu'aucun élément de comparaison ne peut exister ce qui le différencie beaucoup du disque L-4 L-5 (normalement le plus épais de tous). Naturellement une histoire très ancienne de hernie discale peut s'accompagner de signes d'arthrose vertébrale plus ou moins diffus ou parfois limités à l'espace intéressé. C'est dans ce cas que l'on peut vraiment parler de discarthrose. Mais, ici encore, des réserves doivent être faitrs car la densification des plateaux vertébraux est également un phénomène fréquemment constaté sur l'espace L-5 S-I sans qu'il y ait, à notre avis, une signification très pathologique. Il n'appartient pas au radiologiste de poser, dans son compte-rendu, le diagnostic de hernie discale.

Etant donné d'une part, que l'examen clinique et l'interrogatoire nous permettent le plus souvent une présomption de localisation qui est presque constamment confirmée par les constatations opératoires; d'autre part, comme nous le verrons, qu'au cours même de l'intervention il est très facile de préciser cette topographie, nous avons à peu près complètement abandonne les *méthodes de contraste.* Elles nous ont été extrêmement utiles dans les premières années de notre pratique, mais nous avons appris par l'expérience à nous en passer; ce que nous avons vu des radiculographies au Méthiodal ne nous a pas convaincu que ce mode d'examen réalisait un progrès important *dans l'indication opératoire* qui résulte non pas de l'image radiologique mais bien du syndrome clinique, de son intensité ou de son caractère rebelle. Les méthodes de contraste, mais moins encore que l'examen standart, sont surtout utiles pour préciser l'étiologie d'une sciatique pouvant résulter d'une spondylite ou d'une tumeur intrarachidienne.

Naturellement il est utile d'être informé de l'anatomie exacte si variable de cette région lombo-sacrée et d'attribuer leur importance vraie aux diverses anomalies qùe l'examen radiographique y révèle si souvent. Il faut savoir qu'aucune des malformations de la région ne doit faire exclure le diagnostic de hernie discale: nous avons, comme tous les chirurgiens qui s'occupent de ce problème, trouvé des hernies discales absolument typiques chez des sujets porteurs non seulement de toutes les anomalies de transition de cette région (sacralisation, lombalisation etc.) mais encore de spondylolisthésis parfaitement authentique.

3. *Indication Opératoire.*—L'indication opératoire, nous l'avons parfois dit, est posée en général *par le malade lui-même* devant l'échec ou l'insuffisance des thérapeutiques mises en oeuvre, la persistance des troubles sévères ou intolérables, la fréquence des récidives. Il est bien entendu, comme nous l'avons souligné au Congrès International de Chirurgie Orthopédique à Stockholm, en 1952, qu'il faut à cet égard bien distinguer le problème de la *lombalgie* qui est un problème peu chirurgical, et celui de la *sciatique* dont la solution la

meilleure est souvent l'intervention. Le délai de trois mois pour qualifier de rebelle une sciatique est raisonnable; néanmoins, dans les formes hyper-algiques, on peut parfaitement réduire ce délai, étant donné le caractère bénin de l'intervention et les résultats immédiats et satisfaisants que l'on en obtient.

C'est précisément dans les formes ou aux stades plus aigus lorsque le malade souffre beaucoup, est en pleine crise, que l'on a des chances de faire l'intervention la plus satisfaisante et qil faut se méfier des indications posées "à froid": sur le malade qui ne souffre plus, on risque fort de ne pas trouver facilement ou de ne pas enlever complètement la hernie responsable.

Naturellement certains malades sont très pressés de se faire opérer et il faut quelquefois savoir les faire patienter ou leur faire accepter les autres traitements qui peuvent avoir raison de leur crise surtout si c'est la première. A cet égard, en dehors des manipulations ou des tractions vertébrales sur table, dont nous n'avons pas la pratique personnelle, mais que nous faisons volontiers tenter chez nos malades, la simple mise en extension continue sur les membres inférieurs pendant quatre à huit jours, le malade allongé sur plan semi dur, apporte souvent une sédation spectaculaire et permet d'éviter l'intervention.

Lorsque cello-ci est nécessaire, nous la réalisons de façon *aussi simple que possible:* minimum d'instrumentation, un seul aide.

a) *Anesthésie:* de façon presque constante nous employons l'anesthésie locale avec seulement une préparation faite une heure avant par une injection intra-musculaire de Dolosal-Phénergan. Cette injection peut d'ailleurs être renouvelée au moment même de l'intervention si le malade est énervé et selon les réactions individuelles: nous n'en avons jamais eu d'inconvénient. La région est infiltrée de Scurocaïne à 1 pour deux cent: injection traçante intradermique sur la ligne médiane de l'apophyse épineuse de L-3 à S-I, infiltration prefonde des masses musculaires de part et d'autre de cette ligne jusqu'au plan osseux. On obtient ainsi une anesthésie et un relachement musculaire absolument parfaits dans l'immense majorité des cas. Cependant quelquefois le malade souffre tellement de sa sciatique qu'il ne lui est pas possible de se mettre en position opératoire et qu'il faut utiliser l'anesthésie générale avec intubation ou une rachi-anesthésie. Dans ces deux cas on se prive du secours très précieux que constitue la conservation de la sensibilité profonde, comme nous le verrons dans un instant.

b) *Position opératoire:* nous opérons tous nos malades en décubitus ventral. Position confortable à la fois pour le malade et pour le chirurgien.

c) *Réanimation:* aucune réanimation n'est nécessaire, l'anesthésie locale diminue en effet considérablement l'hémorragie. Jamais nos malades n'ont perdu plus de quelques centimètres cubes de sang et nous n'avons pas de souvenir d'avoir jamais eu recours à une perfusion soit per-opératoire, soit post-opératoire, dans des opérations pour sciatique. Nous avons toujours été extrêmement surpris de voir dans certains centres une perfusion de sang systématiquement installée dans des opérations de ce type. Si l'on veut bien considérer avec nous qu'elle est parfaitement inutile on se rend compte du gaspillage de sang ou de substance à perfusion qui peut être réalisé dans cette chirurgie.

d) *Technique Opératoire:* après incision de la peau, les muscles sont décollés de part et d'autre des apophyses épineuses au bistouri électrique. L'apophyse épineuse de L-5 est systématiquement réséquée. Nous avons délibérément abandonné, après quelques tentatives, les abords unilatéraux et la conservation des apophyses épineuses. La reconstitution musculaire se fait beaucoup mieux par suture des muscles ensemble que lorsqu'on conserve l'apophyse épineuse et l'ablation de celle-ci n'a absolu-

ment aucun inconvénient. Par contre, l'accés sur l'espace inter-lamaire et les manoeuvres d'exérèse sont infiniment plus faciles et par conséquent moins dangereux et plus efficaces.

A ce moment les deux ligaments jaunes L-4 L-5 et L-5 S-1 sont parfaitement exposés. L'écarteur autostatique étant mis en place il suffit d'appuyer doucement avec un instrument mousse sur la partie latérale du ligament jaune pour réveiller la douleur caractéristique de la sciatique que est indiquée par le malade. On peut ainsi confirmer la présomption clinique de la localisation.

Le ligament jaune est excisé en totalité, la fenêtre inter-lamaire de dimension très variable est ouverte, un tampon de coton est introduit entre la dure-mère et le plan osseux postérieur, ce qui permet en toute sécurité d'utiliser la pince gouge fine et coudée pour agrandir à la demande, quelquefois très peu, quelquefois beaucoup, l'espace inter-lamaire du côté malade et pour dégager la racine soulevée. Au préalable une injection intra-durale de Scurocaïne à 4% (2 cc^3) a permis d'obtenir l'anesthésie radiculaire indispensable pour la poursuite de l'opération et qui n'a plus d'inconvénient à partir du moment où la localisation a été reconnue. Il faut avoir la patience d'attendre quelques minutes cette anesthésie qui pourrait être aussi obtenue par injection directe dans la racine avec une aiguille très fine de quelques gouttes de Scurocaïne à 1 p. 200.

Il faut dégager aussi largement que possible, en dehors la tuméfaction formée, le plus souvent, par la racine étalée sur la hernie. Quelquefois la gouge et le marteau sont utiles pour ce dégagement. Il y a toujours entre le plan osseux et la racine une expansion latérale du ligament jaune qu'il faut également exciser.

Ce n'est que lorsqu'on voit bien le bord externe de la racine qu'à l'aide d'une spatule mousse on peut doucement la décoller de la hernie sous-jacente et la récliner en dedans. A l'heure actuelle nous enlevons en effet pratiquement toutes les hernies par voie extra-durale et en passant en dehors de la racine. Quelquefois cependant, il faut récliner la racine en dehors et enlever la hernie par l'aisselle de la racine entre elle et la dure-mère. L'accés transdural est devenu une rarissime exception alors qu'il était presque de règle dans nos toutes premières interventions.

Il est parfois difficile de mobiliser la racine sur la hernie à laquelle elle peut adhérer étroitement et c'est dans ce temps qu'une manoeuvre un peu brutale peut entrainer une déchirure de la gaine durale avec issue de liquide céphalo-rachidien, ce qui n'est pas grave, mais surtout une hernie de quelques fibres radiculaires ce qui est plus ennuyeux. Il faudra couvrir cette petite brèche insuturable d'un lambeau musculaire aplati avant de terminer l'intervention.

La hernie est alors dégagée, extirpée par simple traction en un ou plusieurs fragments dans les cas les plus favorables, ceux de hernie à capsule rompue (assez fréquents au niveau de L-5 S-I), excisée par évidement conoïde à l'aide d'un bistouri fin dans les cas de hernie à capsule intacte. L'évidement devra aller assez loin dans le disque et ce sont ces évidements sur des hernies "non mûres" qui peuvent être incomplets et laisser parconséquent la possibilité des récidives.

L'ablation de la masse nucléaire entraine une détente des structures de la région qui est souvent suivie d'une hémorragie veineuse au moment où l'on enlève les petites digues de coton mouillé que l'on a placé au-dessus et au-dessous de la hernie. Cette hémorragie s'arrête toujours très facilement par simple compression de quelques minutes comme un saignement de nez. Exceptionnellement un petit fragment de muscle peut être placé sur une veine que l'on ne pourrait coaguler sans risque pour la racine voisine.

Il est prudent, surtout dans les cas où

les constatations ne sont pas d'une netteté absolue, de palper à l'aide d'un instrument mousse, curette coudée par exemple, l'espace sus-jacent ou sous-jacent et de ne pas hésiter à l'explorer chirurgicalement si l'on a l'arrière-pensée d'une seconde hernie possible mais cette éventualité est assez rare et il ne nous est pas apparu que l'exploration chirurgicale des deux espaces devait être faite systématiquement.

Les muscles sont suturés au fil d'acier sur la ligne médiane: deux points profonds et cinq ou six points superficiels suffisent, un petit drain de sûreté peut être placé dans les cas où le suintement hématique parait l'exiger. Depuis que nous avons remplacé le catgut par les fils d'acier pour la suture, nous n'avons pratiquement plus observé d'hématome et la tolérance au fil d'acier est bien meilleure que celle des soies ou des fils de nylon.

e) *Soins post-opératoires:* Le malade est laissé allongé pendant huit jours; les quarante huit premières heures sont assez pénibles, l'évacuation des gaz quelquefois même celle des urines nécessite un peu d'aide. La douleur sciatique disparait dès l'opération mais la région lombaire reste endolorie pendant deux à trois jours.

Le lever est autorisé au 8è jour et le malade quitte l'hôpital ou la clinique entre le 10è et le 12è jour. Un repos complet de un mois est accordé après l'intervention et la reprise d'une activité physique importante n'est autorisée qu'après trois mois, un travail léger pouvant parfaitement être repris dès la fin de la convalescence.

f) *Résultats:* On peut dire que lorsque l'indication est correctement posée devan une crise de sciatique rebelle ou récidivante, que le malade est opéré en pleine poussée, les résultats sont constants et spectaculaires.

Il peut persister un état lombalgique qui nécessite la réadaptation musculaire progressive à l'effort, quelquefois le port d'un lombostat; nous avons pratiquement abandonné depuis quatre à cinq ans les greffes vertébrales plus inutiles que vraiment dangereuses dans ces cas mais dont nous avons vu des désastres lorsqu'elles ont été appliquées sans discernement à certaines lombalgies pures.

Les récidies de la sciatique ne sont pas exceptionnelles après intervention. Nous les avons indiquées dans notre rapport de 1952 à Stockholm et notre expérience n'a fait que se confirmer depuis à cet égard. On peut les chiffrer à 8 et 10% et il faut distinguer:

1. *Les récidives immédiates:* souvent même au décours de la période opératoire, par éternuement, mouvements intempestifs etc. et qui résultent de la luxation brutale d'un fragment de nucléus oublié au même niveau. Ces récidives justifient la réintervention immédiate.

2. *Les récidives plus tardives:* peuvent se voir plusieurs mois ou plusieurs années après l'intervention soit au même niveau et du même côté, ce qui est exceptionnel, soit du côté opposé ce qui est relativement fréquent en particulier au niveau du disque L-4 L-5, soit enfin au niveau sus-jacent ou sous-jacent, ce qui est rare.

En dehors des récidives il y a quelques incidents post-opératoires possibles: signalons d'assez rares accidents d'infection qui se jugent par la persistance de fistulettes entretenues par les fils d'acier, qu'il faut alors retirer secondairement, chose désagréable mais sans inconvénient majeur.

Une complication assez particulière est le déclanchement d'un syndrome lombalgique suraigu accompagné de raideur lombaire totale qui peut laisser un état d'impotence de plusieurs semaines après une intervention en apparence tout à fait simple et régulière. Cette complication, que nous avons observée à quatre ou cinq reprises, a été décrite par d'autres et parait liée à une infection larvée de la cavité du disque inter-vertébral. Dans le dernier cas que nous avons observé, et qui concernait un de nos confrères, elle s'est ac-

compagnée d'un petit état infectieux avec élévation de la vitesse de sédimentation. Etats très pénibles, qui sont très préoccupants pour le malade qui espérait une guérison rapide de son mal et voit son impotence se poursuivre pendant de longues semaines, de sorte que son moral s'en trouve affecté, mais s'atténuent cependant progressivement et aboutissent à la guérison lente avec récupération progressivement complète de la mobilité vertébrale.

Dans l'ensemble les résultats sont très bons en ce qui concerne l'algie sciatique et c'est ce qui explique la faveur dont cette intervention continue à jouir en dépit de l'apparition de tant de méthodes nouvelles de traitement de la sciatique, y compris les injections intra-rachidiennes d'Hydro-Cortisone qui ne nous ont paru ni toujours efficaces, ni toujours bien supportées et surtout les manipulations et élongations au sujet desquelles on peut faire les même remarques.

RÉSUMÉ

En s'appuyant sur une pratique de 20 années portant sur environ 2000 cas de sciatique discale opérés, l'auteur évoque les divers éléments cliniques, diagnostiques et thérapeutiques qui le guident dans le problème de la sciatique discale. Il souligne que le traitement opératoire est très loin d'être la règle mais qu'il donne des satisfactions qui ne se sont pas démenties depuis que cette technique est entrée dans la pratique chirurgicale classique. Il considère que les éléments cliniques sont presque toujours suffisants à eux seuls pour poser l'indication chirurgicale. Les examens radiologiques par contraste ne sont que très exceptionnellement nécessaires.

L'intervention doit être simple et bénigne. Elle est parfaitement réalisable sous anesthésie locale et sans la moindre hémorragie, de sorte qu'elle n'implique ni préparation spéciale, ni réanimation. Elle n'entraine qu'une hospitalisation de 10 à 12 jours et constitute un traitement rapide, efficace et le plus souvent définitif de la sciatique discale sévère. Le problème de la lombalgie, par contre, n'apparait que très rarement comme un problème chirurgical.

The Medical Profession will always have to fight against the claims of wrong-headed, and too often dishonest individuals and "schools" as they call themselves. A fraction of every community will always run after the false prophets. There are a certain number of squinting brains, as there are of squinting eyes, among every thousand of any population. There will always be a corresponding number of persons calling themselves physicians, ready to make a living out of them.

—*Holmes*

L'Avenir de la Chirurgie en Europe en Fonction de l'Evolution Technique et de l'Evolution Sociale

(The Progress of Surgery in Europe: Its Role in Technical and Social Evolution)

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LYON, FRANCE

SI, dans tous les domaines, l'Histoire des Collectivités humaines a toujours été marquée par une constante évolution il est incontestable qu'au cours du dernier siècle, et plus encore au cours des dernières dizaines d'année, cette évolution a précipité son rythme et pris parfois, en dehors même de tout épisode d'action violente, les caractères d'une véritable révolution.—Cette "Accélération du monde moderne" si bien définie récemment par Gaston Berger—a entrainé, dans presque tous les secteurs de l'activité humaine, et sous toutes les latitudes, un bouleversement considérable des traditions et des conceptions anciennes, tant sur le plan social, économique et politique que sur le plan intellectuel ou scientifique.—Et l'interdépendance chaque jour plus accusée de ces divers plans, dans la tendance générale d'une évolution qui, globalement, subordonne de plus en plus les droits de l'individu à la collectivité et à la majorité de cette collectivité, fait qu'aucune discipline et aucune pratique particulière ne saurait prétendre échapper dans son devenir aux doubles effets de son évolution propre et de l'évolution simultanée de la conjoncture économique, politique et sociale.

Il en est tout particulièrement ainsi de l'art et de la science médicale, et de notre discipline particulière, la chirurgie, qui n' en est qu'une forme clinique. Etudier leur évolution actuelle, et présupposer leur avenir en fonction du seul progrès de leurs connaissances et de la mise à leur disposition de nouvelles techniques, serait une erreur.—Ce serait méconnaître que la médecine est, dans sa nature même, un art d'application à l'homme—et qu'ainsi, par l'intégration de cet homme dans la collectivité—son mode d'exercice, ses effets, ses résultats retentissent sur le corps social—tandis qu'inversement sa pratique est étroitement dépendante des conditions que lui créé ce corps social.—Ce que sera le chirurgien, comme le médecin de demain, dépendra donc pour une part importante

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The progress and development of European surgery, its technical and social evolution and the changes it has brought about in the European scene are discussed in all principal aspects, civil, military, political and professional. Surgical education, qualification and organization are considered on a broad basis as to their probable future effect in the modern world.

des conditions dans lesquelles seront fixés par la collectivité leurs modes de sélection et de formation, leurs conditions de travail, leur indépendance ou leur subordination, leur position morale et leur situation matérielle.—On pourrait penser que cela n'intéresse que l'avenir même du chirurgien; mais en fait, l'avenir de la chirurgie dépendra sans doute, pour une part importante, de l'évolution de nos connaissances dans son propre domaine et des possibilités nouvelles que lui donneront d'autres disciplines scientifiques; mais il dépendra, aussi et surtout, de la qualité de ceux qui seront appelés à l'exercer, de l'enthousiasme qu'ils apporteront dans la recherche chirurgicale, de l'attraction plus ou moins forte exercée sur les élites par la carrière chirurgicale.—Il est donc permis de se demander comment—entre les servitudes et les possibilités nouvelles que leur créeront les progrès techniques—et l'emprise chaque jour plus puissante de la collectivité—se dessinera l'avenir des chirurgiens, et secondairement l'avenir d'une science et d'un art qui furent longtemps considérés comme indépendants des contingences sociales.

C'est dans cet esprit que j'ai voulu aujourd'hui aborder devant vous le problème de l'avenir de la chirurgie dans nos pays au cours des années qui viennent. Sans doute, ce que j'en dirai s'appliqueral-il sur beaucoup de points à l'ensemble de l'art médical: mais je me limiterai à notre commune discipline pour pouvoir, étant chirurgien moi même et parlant devant des chirurgiens, aborder de façon plus concrète l'étude des conditions nouvelles créées à notre art par l'évolution actuelle.—J'ai voulu d'autre part m'en tenir aux conditions créées dans nos Pays d'Europe Occidentale où, malgré les différences de législation, de conditions économiques et parfois politiques, se retrouve une certaine unité de traditions, un certain parallélisme de l'évolution et des tendances—pour qui, d'autre part, l'entrée en jeu du "marché commun" va poser des problèmes d'harmonisation des conditions de formation des Médecins et de l'exercice de la médecine.—Même ainsi limité, le sujet est vaste: et je n'ai pas l'ambition certes de faire autre chose que de l'effleurer.—Je me bornerai donc à me demander si, du fait du retentissement de l'évolution technique de la chirurgie d'une part, des conditions sociales de son exercice d'autre part, sur la sélection, la formation et la position intellectuelle et morale, bref tout ce qui constitue la "personnalité du chirurgien," un certain danger ne menace pas l'avenir même de la chirurgie et quelles sont les conditions qu'il faudrait maintenir pour éviter ces dangers.

Il est certes évident aux yeux de tous que les conditions d'exercice de la chirurgie, que la position du chirurgien et le climat dans lequel il évolue, se sont profondemment modifiés, depuis le début de ce siècle.—Il suffit, pour mesurer le chemin parcouru, de rappeler brièvement ce qu'étaient le chirurgien et la chirurgie il y a seulement cinquante ou soixante ans.—C'était l'époque, pourtant peu lointaine, où venaient seulement d'apparaître les immenses possibilités nouvelles nées, après l'invention et les progrès de l'anesthésie, des découvertes Pasteuriennes et des progrès paralléles de la technique opératoire. Prenant conscience du champ immense ouvert à son action, quelque peu enivré des pouvoirs nouveaux qui le poussaient aux grandes aventures, le chirurgien a pu se prendre alors pour un demi-dieu; il apparaissait aux yeux des profanes, qui le redoutaient un peu, mais le respectaient, percevant en lui le détenteur d'une puissance quasi-miraculeuse, comme un personnage de légende, au moins comme une sorte de grand seigneur prestigieux, ainsi que le rappelait recemment Wertheimer dans son discours d'ouverture ou Congrès Français de Chirurgie.—Enviée et admi-

rée, cette position prestigieuse suscitait autour de lui l'enthousiasme et le désir passionné de ceux qui l'entouraient de devenir un jour son égal.

Ce prestige d'un homme et d'une fonction s'explique aisement, pour qui considère ce qu'était alors l'exercice de l'art chirurgical et ce qu'était le milieu social de l'époque.—Dans la pratique de son art, tout dépendait alors en effet de la personnalité du chirurgien. L'équipement technique était sommaire, et passait au second plan; la salle d'opération pouvait être installée dans n'importe quelle pièce assez vaste et d'éclairage suffisant; l'instrumentation était peu différenciée; les moyens de stérilisation simples.—Un personnel réduit suffisait à assurer le fonctionnement des services opératoires.—Il n'était question ni d'installation radiologique, ni de laboratoire propre au service chirurgical.—Appelé auprès du malade, le chirurgien tirait de sa seule expérience clinique et de son audace l'indication opératoire et la décision, dans un diagnostic et une appréciation des possibilités thérapeutiques où n'intervenaient que rarement les données du laboratoire ou de la radiologie.—L'exécution de l'acte chirurgical dépendait uniquement de sa maîtrise opératoire, acquise en de longs exercices sur le cadavre et au cours de ses années d'étude, et c'est en fonction de cette maîtrise opératoire qu'il étendait plus ou moins les indications, qu'il apportait plus ou moins de hardiesse dans ses décisions. Les conceptions personnelles d'un homme, son tempérament, ses capacités d'exécution technique pouvaient avoir à chaque instant un rôle essentiel dans le choix de l'opération entreprise, et que certains seuls parfois étaient considérés comme capable de mener à bonne fin.—Les suites opératoires, contrôlées elles aussi uniquement par des éléments cliniques d'appréciation, comportaient des soins assez sommaires.—Tout était ainsi centré autour de l'homme capable d'oser et d'entreprendre certains actes, et souvent, en fait, l'acte chirurgical apparaissait ainsi comme une sorte de bref combat engagé entre cet homme et les obstacles rencontrés au cours de l'intervention—comme un drame de courte durée dont l'issue était heureuse ou fatale, mais le plus souvent inéluctablement fixée à l'instant où l'opéré était ramené dans son lit: l'expression populaire "l'opération a réussi" illustrait bien cette conception un peu schematique—qui séduisait les foules et provoquait leur admiration—d'une partie qui se jouait en quelques instants, et où la virtuosité, la rapidité opératoire d'un homme apparaissaient aux yeux des profanes, et même des médecins, comme l'élément prédominant.—Il n'était pas encore question de travail d'équipe, et les progrès spectaculaires accomplis au cours des récentes années avaient été uniquement le fait de quelques hommes, plus audacieux, plus doués, à la faveur de l'asepsie relative obtenue, et du perfectionnement des techniques opératoires.

A cet homme ainsi placé hors du cadre commun par les possibilités nouvelles que lui donnaient les conquêtes récentes de la chirurgie, les conditions sociales de son époque assuraient elles aussi à la fois totale liberté et position dominante.—Il n'existait alors dans aucun de nos Pays—(c'est en 1909, je crois, qu'elles devaient hâitre en Allemagne), de législations d'assurances sociales.—A l'hopital, qui avait gardé, de sa vocation charitable première, le caractère essentiel d'assurer des soins gratuits à ceux dont la situation financière ne leur permettait pas d'être traités ailleurs, le médecin apparaissait comme "donnant" ses soins aux déshérités de la fortune, et la société lui manifestait une certaine reconnaissance de ce don.—Hors de l'Hopital, dans les soins donnés aux malades des classes sociales plus aisées, la liberté était entière, aucun organisme administratif (à part de rares cas d'assu-

rances privées) ne venait s'interposer entre le chirurgien et son malade—Il n'était certes question ni de tarification, ni de barême, et nul n'aurait pensé que la fixation d'un honoraire put dépendre d'autre chose que de la conscience professionnelle du médecin.—Ainsi, tout contribuait à garder à la profession, à côté de son prestige, son caractère entièrement libéral, en même temps que semblait s'ouvrir devant elle un avenir magnifique.—Ainsi se sentaient attirés vers elle, pensant qu'un tel avenir méritait les efforts les plus rudes, les sacrifices initiaux les plus grands—justifiés à l'arrivée par le prestige d'une position morale et matérielle de premier plan—les meilleurs parmi ceux qu'animait la vocation médicale.

Il était inévitable qu'avec les progrès techniques, modifiant les conditions même de la pratique de la chirurgie—avec la multiplication des chirurgiens—avec l'évolution sociale nouvelle, tout cela fut modifié. Nous avons, au cours des 40 ou 50 années qui viennent de s'écouler, à des degrés et sous des formes diverses dans nos différents Pays, vu se marquer cette évolution.

Elle a d'abord été une conséquence nécessaire, de *l'évolution technique même de la chirurgie*. Celle-ci a eu pour conséquence inattendue, à mesure que les possibilités de la chirurgie devenaient plus grandes et que s'étendaient les connaissances en profondeur des chirurgiens, à mesure que les résultats devenaient plus effectifs, d'entrainer une baisse du prestige et de la position du chirurgien.—Ce paradoxe apparent s'explique partiellement, par la naissance de *l'équipe*, se substituant au seul chirurgien et, d'autre part, par la *division de la chirurgie générale* en *spécialités chirurgicales*.

A une époque encore peu lointaine—les chirurgiens de ma g é n é r a t i o n l'ont connu—la composition de ce que l'on n'appelait pas encore l'équipe chirurgicale était simple: un chirurgien, un aide, un anesthésiste d'occasion.—On peut à peine parler d'équipe véritable.—Il n'en est plus de même aujourd'hui, et le service chirurgical apparait comme une organization infiniment plus lourde, plus complexe, plus différenciée.—S'il est vrai que le chirurgien reste le chef et le responsable, *on voit se substituer à l'homme, qui était tout, une équipe en dehors de laquelle l'opérateur le plus expérimenté et le plus habile ne saurait mener à bien certaines tâches*.—Pourquoi?—Sans doute parce que l'exécution de l'acte opératoire est en elle-même, parfois—dans certaines interventions nouvelles nées des progrès de l'art chirurgical,—devenue infiniment plus complexe;—mais surtout parce que, dans l'organisation nouvelle devenue nécessaire, ont pris une importance majeure un ensemble de techniques comportants des servitudes nouvelles, et pour la mise en oeuvre desquelles le chirurgien ne peut plus apparaître comme celui dont dépend toute l'oeuvre accomplie.—Cette "dépersonnalisation" (que l'on excuse le néologisme) de l'acte chirurgical, conçu maintenant comme un ensemble exécuté par une équipe, a été la rançon desprogrès de l'anesthésie, de l'examen pré opératoire et de la préparation des opérés, de la complexité nouvelle des soins post-opératoires, de la notion nouvelle d'une nécessaire "réhabilitation physique et psychique de l'opéré." Qu'il me soit permis de l'illustrer de quelques exemples.

Les progrès de l'anesthésie, et la mise au point des techniques dites de réanimation, ont entrainé d'abord la nécessité, à côté d'installations importantes et onéreuses, d'un personnel spécialisé, médical et para-médical: on ne vise plus seulement à obtenir un sommeil plus ou moins parfait, mais aussi, tong en rendant cette anesthésie aussi peu toxique que possible, à maintenir ou à rétablir chez l'opéré l'équilibre organique, condition nécessaire pour l'exécution d'opérations infiniment

plus longues, plus compliquées, plus choquantes. Nul ne saurait aujourd'hui aborder la chirurgie majeure sans disposer de ces installations et de ce personnel, le chirurgien le plus habile ne saurait s'en passer; un acteur nouveau est apparu auprès de lui dans le drâme,—l'anesthésiste réanimateur—et y joue un rôle essentiel.

Avant l'opération, et pendant celle-ci, s'est imposée comme une seconde nécessité, au lieu de la très simple et sommaire préparation opératoire d'autrefois, la mise en oeuvre quotidienne de moyens d'exploration nouveaux: le service chirurgical est ainsi en constante liaison avec les laboratoires de biologie et d'exploration fonctionnelle, avec les services d'exploration radiologique, exigeant souvent dans certaines disciplines et dans certains actes non seulement une liaison à distance, mais la présence à la salle d'opération même on à côté d'elle d'installations et du personnel nécessaires pour établir des bilans répétés et pratiquer des examens extemporanés, suivre sur des graphiques les incidences de l'acte chirurgical; celui-ci dépend ainsi pour une part de ces collaborateurs nouveaux, dont la place devient également importante, lorsque l'opération est terminée, et que se déroule la période post-opératoire.—La notion de la "maladie opératoire" conçue non seulement par un trouble passager des premiers jours, (exigeantla même surve illance par des examens systématiques répétés, visant à parer au troubles métaboliques divers), mais encore comme une modification plus durable du comportement général de l'individu à la suite du traumatisme opératoire, exigera la mise en oeuvre de thérapeutiques diverses, comprenant, à côté du rétablissement de l'équilibre humoral, toutes les modalités de traitement de réadaptation physique et psychique.—Partout donc, et à tous les stades, intervention d'acteurs multiples, qui ne s'effacent plus entièrement devant l'acteur principal.

Ainsi, au chirurgien "unique étoile" dans le ciel de la thérapeutique opératoire s'est substitutée cette notion, aujourd'hui universellement admise, de "l'équipe chirurgicale" nécessaire, comprenant, sous la direction du chirurgien "maitre d'oeuvre," un ensemble de collaborateurs différenciés, dont chacun a son rôle bien défini et son importance dans l'ensemble complexe que constituent la préparation, l'exécution, la conduite des suites de l'acte chirurgical.—Et sil'importance primordiale de la qualité de l'opérateur demure, il n'en est pas moins vrai qu'elle ne peut plus suffire, dans un grand nombre d'interventions modernes, où le résultat dépend pour autant de la coordination vraie des efforts de tous les membres de l'équipe dans l'espace et dans le temps et de la réalisation de certaines conditions matérielles d'équipement, d'installation, d'organisation. — De ce fait,—et de la multiplication des actes chirurgicaux, considérés maintenant par la foule comme quelque chose de banal et de quotidien,—de la notion répandue partout que le succès opératoire est devenu chose naturelle et qui doit être la règle,—résulte incontestablement une baisse du prestige du chirurgien, qui n'apparait plus à l'extérieur que comme un artisan spécialisé, dont il semblera naturel de contrôler l'activité, de soumettre les actes à un barême, de juger de l'extérieur les résultats comme ceux d'une activité qui n'a plus rien de merveilleux ni d'exceptionnel.

Un second élément de cette relative dépréciation a été la *fragmentation de la chirurgie* en "spécialités chirurgicales." Le chirurgien d'autrefois apparaissait comme une sorte d'homme universel: n'était-il pas, dans certains centres secondaires, par une revanche du "chirurgien barbier" sur le médecin, considéré, parce que chirurgien, comme "consultant" même dans des cas relevant de la pratique médicale? Mais à mesure que s'est étendu le domaine de la chirurgie, que les explorations sont deve-

nues plus complexes, les techniques plus précises, est apparue la nécessité, non plus seulement de séparer complètement l'activité chirurgicale de l'activité medicale, mais encore de fractionner la chirurgie elle-même.—S'en sont détachées d'abord des branches un peu aberrantes, telles l'oto-rhino-laryngologie, l'ophtalmologie, l'obstétrique.—Puis bientôt la chirurgie vraie elle même s'est divisée, divers chirurgiens se consacrant d'abord de façon prédominante, puis exclusivement, à une des parties de l'art chirurgical: orthopédie, traumatologie, urologie, chirurgie thoracique, pulmonaire ou cardio-vasculaire, neuro-chirurgie, etc.—S'il est vrai que, des conquêtes nouvelles et spectaculaires de certaines de ces branches de la chirurgie générale est né un nouveau prestige aux yeux des foules émerveillées (il en est ainsi par exemple des conquêtes de la chirurgie cardiaque), pour la majorité de nos disciplines au contraire, la séparation du tronc commun a été marquée par une perte de prestige.—L'impossibilité pour le chirurgien de donner réponse à tout, l'obligation d'avoir, pour certaines décisions, recours à un confrère d'une autre discipline,—l'impression donnée ainsi d'une connaissance fragmentaire qui paraissait, aux yeux des profanes, une infériorité,—tout cela a contribué à dépouiller le chirurgien de cette auréole qui flottait autour de la tête des grands opérateurs du début du siècle,—dont la compétence paraissait universelle,—et les pouvoirs ainsi plus étonnants.

De l'évolution même de la chirurgie, qui quittait ainsi, progressivement, le domaine du merveilleux et de l'exceptionnel pour entrer dans celui de la pratique journalière d'une technique, résultait donc une sorte de baisse de la position morale et sociale du chirurgien. — Mais, parallèlement à cette évolution technique, l'évolution sociale, et tout particulièrement le développement des lois d'assistance et d'assurance, devait avoir pour effet de faire entrer l'activié chirurgicale dans le cadre des activités contrôlées et codifiées.—Dans la société moderne, le chirurgien, comme le médecin, n'est plus considéré comme un homme apportant aux autres hommes, dans l'accomplissement d'une mission qui gardait un caractère quelque peu mystérieux et sacré,—le secours bienfaisant de son art,—mais comme un artisan spécialisé, instrument d'un service social, dont les pouvoirs publics considérent qu'il doit être pris par eux en tutelle, soumis à une organisation créée par eux et contrôlée par eux.

Il y a eu certes, à cette tendance des pouvoirs publics et de la collectivité, des raisons multiples, qui toutes ne sont pas nobles et valables; il serait trop facile de développer longuement ces dernières raisons: tendance générale à l'emprise de plus en plus étroite de l'état et des collectivités sur les activités privées,—par une sorte d'impérialisme administratif,—obscure et souvent inconsciente jalousie des cadres fonctionnarisés, à l'égard des professions dites libérales,—facile démagogie qui veut masquer par la promesse de la médecine gratuite et obéissante l'incapacité de l'état à donner satisfaction à d'autres aspirations populaires en d'autres domaines: je n'y veux pas insister, pour chercher les raisons plus profondes de cette subordination progressive.

A la base de cette évolution, voulue par les pouvoirs publics il y a d'abord une *mystique*, louable en soit, mais dont on a tiré des conséquences et des applications souvent contestables: c'est la mystique du "social."—Faire du social est un slogan à la mode, adopté par nombre de néo-sociaux, qui ont totalement oublié, ou n'ont jamais su, que, depuis toujours, les médecins s'honorent d'avoir fait du "social," sous une forme qui s'est appelée longtemps la charité et le dévouement aux malades, dévouement gratuit lorsque la situation de celui-ci le justifiait, dévouement qui gar-

dait sa signification humaine même s'il était honoré, dans d'autres cas.—Certes, nul ne conteste qu'il était, dans l'état social actuel, utile, et même nécessaire, de faire plus, ou de faire autrement,—et que l'institution des lois sociales d'assistance et d'assurance s'imposait, qu'elle devenait d'autant plus nécessaire du fait même des progrès et de l'extension de la thérapeutique chirurgicale ou médicale,—dont la mise en oeuvre devenait chaque jour plus onéreuse.—Nul ne conteste qu'elles devaient entrainer une certaine évolution dans l'exercice de notre profession, une collaboration et des accords conventionnels avec les organismes créés par ces lois et qui disposaient des ressources financières destinées à leur application.—Mais il n'était nullement obligatoire qu'à cette collaboration nécessaire on eut tendance, trop souvent, par esprit de suspicion et de méfiance, à substituer une subordination du médecin, et une réglementation étroite et tatillonne, assimilant les soins à une marchandise taxée sans nuance, méconnaissant totalement certains aspects humains du problème et souvent l'intéret réel du malade,—qui exige avant tout des soins de qualité donnés par le meilleur, non une médecine de série, en définitive onéreuse autant qu'inhumaine.

Il y a plus. A cette mystique du "social," (dont nous restons certes des adeptes, si nous critiquons certaines de ses déviations),—s'est surajoutée une autre mystique: celle de l'état tout puissant et tentaculaire, et celle de l'état-providence, —se substituant partout, directement ou par l'intermédiaire de grands organismes semi-étatisés, aux institutions privées, dans l'organisation et la gestion de la santé nationale, devenue un service public.—Certes, là encore, l'évolution technique même de la médecine et de la chirurgie conduit-elle souvent à l'intervention nécessaire des pouvoirs publics; celle-ci se justifie par le fait que, devant la puissance et l'importance des moyens nouveaux exigés par l'évolution de la thérapeutique, par les besoins de la recherche, par l'organisation de la réhabilitation et du reclassement des malades ou des infirmes,—l'état seul, (où les grands organismes d'assistance ou d'assurance qui en émanent),—à défaut d'organismes privés assez puissants et riches,—est capable de fournir ces moyens d'action. Du moins, son aide devient-elle indispensable, et il est normal alors qu'il intervienne dans l'organisation générale et dans la répartition de ces moyens.—Mais sa tendance naturelle est d'aller beaucoup plus loin et d'imposer à ceux qui gardent la responsabilité de la mise en oeuvre des moyens thérapeutiques des contraintes et des conditions d'exercices qui modifient radicalement le caractère même de la profession, et risquent, en en détournant les meilleurs, en supprimant le caractère humain et personnel des rapports du médecin et du malade, d'aboutir en définitive à un abaissement de la qualité des soins donnés.—Il est en effet à redouter (et l'expérience l'a déjà prouvé en maintes circonstances) que l'intervention nécessaire des pouvoirs publics ou des grands organismes qui en émanent aboutite souvent à une justification d'actions abusiv. "Possesseur des moyens, écrivait André Siegfrid," l'état tient la savant soit pour la contrainte, soit par le tentation de les lui offrir. Dès lorse, le résidu laissé à la liberté est bien mince. Cette tendance est certaine, dans la plupart de nos pays; la médecine et la chirurgie,—pas plus que les autres branches de l'activité intellectuelle et scientifique,—n'ont échappé à cette emprise.—Si, bien heureusement, on ne peut encore, nous le verrons plus loin, dans la plupart de nos pays d'Europe Occidentale, parler d'un Corps Médical asservi, il est des cas déjà où cette inféodation à l'état est manifeste, aboutissant à la subordination de notre profession, non aux véritables intérêts du malade, mais

à l'intérêt de l'état ou de grands organismes collectifs, au mépris des véritables intérêts de ceux auxquels il devrait d'abord penser.

Au sens d'une évolution ainsi commandée par une mystique politique, viennent apporter des justifications apparemment indiscutables des arguments tirés d'une part de la constatation de certains abus, de certaines erreurs, de certaines fautes,—d'autre part l'interposition entre le malade et le chirurgien ou le médecin d'organismes détenteurs des moyens de paiement, et qui comme tels sont appelés à exiger une pré vision possible des dépenses, une justification des frais engagés, et un contrôle.

Il faut avoir le courage de l'avouer,—en le déplorant,—si la position morale et le prestige du chirurgien ne sont plus ce qu'ils ont été, et si le législateur a pu proposer certaines réglementations outrancières, ce n'est pas uniquement pour les raisons jusqu'ici analysées, ou pour d'autres sur lesquelles nous reviendrons plus loin.—C'est aussi par ce que,—un peu partout,—des exemples ont pu être cités de fautes ou d'abus d'une minorité de chirurgiens, qui n'avaient pas gardé la haute conscience et le sens du devoir professionnel et des droits du malade, conditions essentielles de l'art médical.—Certains ont abusé, malheureusement, des possibilités que leur donnait l'exercice de cet art, soit pour étendre à l'exèès des indications contestables, soit pour spéculer sur l'espoir mis en nous par le malade pour en obtenir des honoraires abusifs.—Ces cas ont été, je le répète, le fait d'une minorité, que l'ensemble des chirurgiens condamne avec une sévérité plus grande encore que celle des profanes.—Mais ils ont été retenus, mis en vedette, exploités par ceux pour qui l'indépendance et le caractère libéral de la médecine constituent un motif d'irritation et d'envie,—et c'est ainsi qu'aux accords légitimes et nécessaires nés de la nature même des rapports nouveaux avec les organismes appelés à couvrir les frais de soins, aux contrôles acceptables, prenant le caractère d'une "liaison" entre Médecins Conseil et Praticiens plus que d'un contrôle vrai,—ont été substitués,—en certains pays des régimes forfaitaires inacceptables,—en d'autres des contrôles vexatoires et irritants, inacceptables pour ceux qui, par leur conscience professionnelle, s'estimaient au dessus d'une telle inquisition et avaient de leur profession une idée plus haute.

Mais, en fait, le Corps Médical eut-il été toujours indemne de toute critique, qu'il n'eut pas été besoin de telles raisons pour qu'apparut une codification de l'activité chirurgicale et un contrôle des actes chirurgicaux: les organismes "payeurs" auraient été inévitablement appelés, de par leur nature même, à établir cette règlementation.—Il faut bien en effet reconnaître qu'en elle même était devenue nécessaire,—(schoquante qu'elle soit pour nous, si contraire à notre esprit, à nos traditions passées)—cette notion de "tarification."—Un organisme responsable des fonds constitués par les cotisations des assurés sociaux ne saurait s'abstenir de prévoir les charges que représentent pour lui les soins médicaux ou chirurgicaux, proportionnelles d'une part au nombre et à la nature des actes accomplis (il en faut alors pouvoir préciser la valeur "marchande"), d'autre part aux résultats obtenus, dont dépendent les durées d'incapacité temporaire et le montant des rantes d'incapacité permanente partielle ou d'invalidité définitive.—On conçoit même, dans une certaine mesure, que, soucieux de diminuer ces charges, l'organisme payeur ait pu discuter la notion de liberté de choix du médecin,—notion à laquelle tant de nous sont justement attachés,—et celle de la liberté d'indications thérapeutiques, jugeant que le traitement des malades dont ils avaient la charge devait être confié à des praticiens choisis par eux pour leur

compétence et leur conscience dans les meilleurs conditions de rendement individuel et social, et qu'il existait de la part de leurs conseils médicaux, un droit de regard sur la thérapeutique instituée.

C'est ainsi que dans tous nos pays, sous des formes diverses, nous avons vu apparaitre, d'une part, la notion de "nomenclature" des actes médicaux et chirurgicaux, —d'autre part celle du contrôle technique des soins, celle du contrôle même de l'activité professionnelle, se donnant pour justification de viser à assurer à la clientèle—notamment à la clientèle hospitalière—des garanties de soins attentifs et compétents, dans les meilleurs conditions de "rendement." Ces divers soucis, nous les retrouverons, sous des formes diverses, et à des degrés très variés, dans les législations ou règlementations de nos différents Pays.

Il eut été intéressant de pouvoir, à ce point de vue, faire une étude précise et complète, comparant dans nos divers pays la position du Chirurgien, mesurant les degrés divers des atteintes portées au caractère libéral de son activité, jugeant l'évolution de son standing moral et matériel.—Cette étude est en fait difficile.—Les situations sont trop diverses, les renseignements recueillis souvent fragmentaires, parfois contradictoires, les législations et leur application d'interprétation difficile, les effets diversement appréciés. C'est donc en m'excusant à l'avance des lacunes, ou des erreurs commises, que j'essaierai—très brièvement—après avoir remercié ceux de mes collègues étrangers qui ont bien voulu répondre à une rapide enquête—de faire le point de cette évolution dans quelques uns des pays qui nous entourent.

Il en est—telle la Grande Bretagne—où l'activité du chirurgien s'intègre le fonctionnement d'un "Service National de Santé" réglementant l'ensemble de la profession médicale. Je ne saurais m' attarder sur l'étude de ce qu'a donné globalement le Service National de Santé, elle nous mènerait beaucoup trop loin et a d'ailleurs fait l'objet de nombreux rapports, aux conclusions souvent contradictoires. Du point de vue qui nous intéresse ici—l'exercice et l'évolution de la chirurgie—un jugement est difficile. D'une part, il semble que l'organisation actuelle de la chirurgie hospitalière en Angleterre ait eu un heureux effet sur l'équipement hospitalier, l'organisation de la hiérarchie des Centres de soins, l'orientation de certaines catégories de malade vers ceux de ces centres qui sont les mieux équipés en moyens matériels et en hommes pour l'application de certaines thérapeutiques. D'autre part, d'après ce que j'ai vu et entendu, il semble que le libéralisme britanique, même dans le cadre apparemment rigide du Service National de Santé, non seulement ait respecté nombre d'autonomies, mais encore ait laissé, au moins en ce que concerne les grands maîtres des Centres Universitaires, une indépendance de l'exercice professionnel beaucoup plus grande qu'il n'aurait pu sembler a priori: l'autonomie relative des Universités, leurs traditions, l'apport d'une clientèle internationale ont contribué, là à maintenir le standing des chirurgiens occupant une situation de premier plan. Il n'en est pas de même semble-t-il, pour la masse de ceux que l'on peut appeler les "praticiens moyens" de la chirurgie, et pour "les jeunes"; mais nous manquons de données précises pour apprécier dans quelle mesure ils ont été atteints par leur incoporation dans le service National de Santé. Sans porter donc un jugement dont nous n'avons pas les éléments, nous ne pouvons, pourtant manquer de faire connaître une constatation d'une gravité particulière, faite devant nous et un groupe important de chirurgiens étrangers, dans une Grande Université d'Angleterre, par un Maître incontesté, Chef d'une Ecole Jouissant d'une renommée mondiale

—Maître non suspect d'esprit "réactionnaire." Au terme d'une exposé où il nous avait montré l'organisation régionale de sa spécialité dans le Secteur rattaché à son centre chirurgical—insistant sur certains aspects heureux de la réforme à ce point de vue—il nous disait constater avec inquiétude, après 10 ans de Service National de Santé, que le recrutement de ses Assistants tendait à se tarir: la profession n'attire plus les jeunes, disait-il, qui se détournent vers d'autres activités, n'espérant plus de la carrière chirurgicale les satisfactions d'autrefois. Il y a là une constatation grave, que je soumets aux réflexions de nos législateurs, dont les décisions sont trop souvent prises loin des faits et des réalités de nos disciplines.

Aux Pays Bas, où existe aussi un Service National de Santé, il semble, d'après les informations qu'a bien voulu me communiquer un de nos Collègues, que ce système ait aussi laissé subsister un certain libéralisme de la profession chirurgicale: exercice à l'Hopital tantôt à mi temps, tantôt à plein temps, avec ou sans liberté de clientéle à l'extérieur (tout cela dépendant du contrat spécial entre l'Hopital et le Chirurgien, et les situations les plus diverses existant), absence de subordination étroite à l'égard de l'administration et du Ministère de la Santé Publique—existence d'honoraires libres en pratique de Ville, sans tarif imposé, ni tiers payant. Mais il ne nous a pas été précisé de quelle manière ce libéralisme s'articule avec le fonctionnement du Service National de Santé, ni quelles catégories de la population peuvent être traitées en clientèle libre.

Dans les autres Pays d'Europe Occidentale, il n'existe pas d'institution véritable d'un Service National de Santé. La chirurgie y est exercée partout dans des conditions qui, à des degrés divers, présentent un certain mélange du libéralisme ancien et de réglementations conséquence des législations nouvelles.

Ici même, en Belgique, d'après les renseignements que m'a communiqués aimablement notre Collègue Lambert, les conditions d'exercice sont restées assez libérales. Tout Docteur en Médecine peut en principe, de par son diplome, exercer la chirurgie. En fait, me disait il, cette liberté d'exercice est restreinte par l'existence des commissions d'agréation, dont l'aval est requis pour donner des soins aux assurés sociaux en obtenant le remboursement de leurs frais. A travers tous les modes divers de recrutement des chirurgiens hospitaliers, très variables, si j'ai bien compris ce qui m'a été exposé, suivant les villes, il n'existe pas d'inféodation directe et réelle à l'autorité du Ministère de la Santé Publique. Les régimes les plus divers d'exercice hospitalier existent—full time dans un petit nombre d' Hôpitaux, avec maintien d'une certaine liberté de pratique en dehors de l'Hopital—travail à mi—temps dans la plupart des Hôpitaux Publics ou Privés, où sont soignés assurés sociaux et non assurés sociaux. Il existe une nomenclature classée en catégories, suivant les titres universitaires et hospitaliers du praticien avec, à l'intérieur des catégories, variations importantes des honoraires prévus. Mais les honoraires perçus en fait sont habituellement très supérieurs aux taux de remboursement des caisses, qui n'ont pas modifié la valeur des actes depuis longtemps, malgré la hausse du prix de la vie, et il n'y a pas de tarification imposée avec chiffres d'honoraires opposables: il s'agit d'une simple tarif de remboursement, non opposable, que le chirurgien respecte seulement s'il s'agit de clientèle économiquement faible, et qu'il dépasse plus ou moins dans les autres cas suivant la situation sociale de l'assuré. Il semble donc que dans l'ensemble la tendance à une réglementation autoritaire et égalisatrice ait été momentanément

freinée, et nous savons avec quelle vigueur nos Collègues Belges, sur tous les plans de la pratique médicale, ont lutté pour maintenir contre les tentatives d'autoritarisme abusif le caractère libéral de leur profession.

En Italie, la situation du chirurgien nous parait traduire dans l'ensemble une atteinte plus grave à ses anciens modes d'exercice, une évolution plus marquée vers la tarification autoritaire, avec parfois l'institution du tiers payant, pour une grande partie de la population, et l'extension du système du forfait. L'organisation hospitalière, plus "centralisée" dans le mode de recrutement des chirurgiens, mais restant très diverse et très locale pour la gestion des Hôpitaux, est, ici comme en Belgique, la plupart du temps distincte de l'organisation universitaire — avec pourtant, dans certaines universités, des Hôpitaux Universitaires vrais. Il n'y a pas de Sécurité Sociale Nationale, mais les 4/5 de la population sont affiliés à des organismes mutualistes, soit à l'Institut National de la maladie, qui comporte 20 millions d'adhérents, soit à de nombreuses autres organisations mutualistes. Restent en dehors les malades indigents, relevant de l'assistance médicale des communes, et une minorité de malades non assurés. A l'Hopital, tous les assurés sociaux sont traités gratuitement, les organismes assureurs versant un honoraire global pour l'ensemble du personnel soignant (chirurgien, anesthésiste, radiologue, biologiste, etc. . . .) honoraire faible, puisqu'il varie entre 9 et 16.000 lires suivant la catégorie de l'acte. En clientèle privée, les chirurgiens —en dehors des "primarius" des grands Hôpitaux et des Professeurs d'Université, dont les honoraires sont libres, sont tenus à l'application d'un chiffre d'honoraires fixé par l'ordre des Médecins (avec un minimum et un maximum). Dans l'ensemble—et mis à part les grands Maîtres, dont la situation morale et matérielle reste très brillante—il ne semble pas que les chirurgiens moyens et notamment les jeunes, pas plus que les médecins, aient en Italie actuellement une situation matérielle et morale comparable à celle d'autrefois: elle souffre de la pléthore médicale et de la dévaluation générale des actes professionnels.

En Suisse, où existe un titre de spécialiste en chirurgie donné par la fédération des médecins Suisse, la nomination des chirurgiens des Hôpitaux est faite par la commission administrative sur l'avis du Professeur de Clinique Chirurgicale. Il n'y a pas de subordination au ministère de la Santé Publique, ni à l'administration, mais uniquement à l'Université représentée par le Professeur titulaire de la chaire de Clinique Chirurgicale. Il n'y a pas d'Hôpitaux Chirurgicaux de caisse (les Hôpitaux sont soit des Hôpitaux Universitaires, soit des Hôpitaux de district). Les conditions de traitement des assurés sociaux varient d'un canton à l'autre: par exemple, dans celui de Zurich, seuls des assurés de la catégorie A, la plus modeste, ont la gratuité des soins, ceux de la catégorie B paient l'hospitalisation, mais non les honoraires, ceux de la catégorie C paient hospitalisation et honoraires; à Geneve au contraire, il est passé des contrats avec certaines caisses d'assurances sociales, dont les membres sont admis à un tarif minimum. Tous les chirurgiens travaillent à mi-temps avec liberté d-exercice en ville. En ville les tarifs d'honoraires sont libres, sauf pour une catégorie de malades, affiliés aux Sociétés de secours mutuels, pour lesquels existent des tarifs imposés avec tiers payants: il y a là, parait-il, une source de contestations et de conflts entre le corps médical et les sociétés d'assurances, car beaucoup de ces malades, rangés théoriquement dans la catégorie des économiquement faibles—et traités comme tels, sont en réalité des ma-

lades aisés, dont la situation justifierait des honoraires libres.

Au Luxembourg, les atteintes portées au caractère libéral de la profession semblent beaucoup plus graves. Il existe une nomenclature des actes chirurgicaux, divisée en 3 catégories, suivant le plafond des revenus: elle est cotée en belgas, non en coefficients de valeur relative—avec référence à un indice et échelle mobile auto matique. Elle s'applique pratiquement à la totalité de la population, les tarifs étant, en fait, opposables.

Nous n'avons pu avoir de documentation précise sur la situation en Allemagne fédérale, du point de vue particulier des chirurgiens; il existe une ancienne nomenclature des actes médicaux et chirurgicaux, tarifée en mark, comprenant des honoraires avec maximum et minimum, dont l'éventail s'applique à la médecine libre—et une nouvelle nomenclature, plus fouillée et établie en actes. Mais nous n'avons pu savoir à qui et dans quelle mesure les tarifs étaient ou non opposables.

Au Danemark, l'assurance couvre 85 à 90% de la population, sous forme d'assurances théoriquement individuelles et volontaires, mais qui pratiquement, fonctionnent à la manière d'une assurance d'Etat. Un régime spécial existe, comme dans la plupart des pays, pour les accidents du travail. Le système d'assurance maladie est centré sur l'hospitalisation, ce qui fait que très peu de malades sont traités en clientèle libre. Les Hôpitaux sont hiérarchisés, et travaillent au régime plein temps. Les chefs de service ont une situation morale et matérielle importante, mais les "juniors" sont devenus des salariés avec horaire de travail précisé et imposé, et leur situation est très médiocre et a fait l'objet de nombreuses plaintes. Dans l'ensemble le système est très loin de la médecine libérale, pour les chirurgiens comme pour la majorité des médecins.

J'en viens à la France. En France, on peut considérer que la situation est en pleine évolution. Jusqu'ici, en effet, la chirurgie avait gardé son caractère de profession libérale, globalement, avec des exceptions sur lesquelles je reviendrai. A l'Hopital les Chirurgiens, recrutés par concours, indépendants des concours universitaires (mais, en fait, dans les villes universitaires, nombre de chirurgiens avaient à la fois le titre universitaire et le titre hospitalier), étaient, dans l'immense majorité, au régime temps partiel, exerçant en dehors de l'Hopital librement en ville dans des cliniques privées, ou, lorsqu'il n'y avait pas de clinique privée, (dans certaines petites villes notamment), suivant le système dit de la, clinique ouverte, à l'Hopital, un secteur de l'Hopital étant ouvert à l'exercice privé des chirurgiens, même non hospitaliers. Le versement d'honoraires à l'hopital, institué seulement il y a un vingtaine d'années, est régi par des textes qui le fixent à un chiffre très bas: 20 à 40% du taux de remboursement des honoraires de Securité Sociale en Ville, taux lui-même resté faible. On arrivait ainsi, par le nombre des actes effectués, à des chiffres globaux très inégaux suivant les Hôpitaux, parfois faibles, parfois très élevés. En ville, théoriquement, depuis l'ordonnance de 1945, le tarif de responsabilité de Sécurité Sociale était opposable pour les assurés sociaux; en fait, l'ordonnance n'a pas été appliquée et n'a pu l'être, les chiffres de remboursement étant restés ridiculement faibles par rapport à l'élévation générale des prix. Pour l'accidentés du travail, au contraire, ces tarifs étaient appliqués, étant versés par tiers payant. En fait, les situations étaient très variables. En de nombreuses régions, les tarifs effectivement pratiqués par les chirurgiens dépassaient peu les tarifs de responsabilité des caisses; tandis que dans d'autres régions, et notamment dans les grandes villes, ils étaient nettement supérieurs. Mais dans ces grandes

villes existaient parfois en grand nombre des cliniques dites "conventionnées," acceptant le paiement direct des honoraires, au tarif de remboursement, par la caisse; ailleurs, des mutuelles, groupant un grand nombre d'adhérents, imposaient aux chirurgiens opérant leurs malades de ne pas dépasser un tarif fixé assez bas. Ainsi, si le caractère de la profession était resté libéral pour un grand nombre d'entre nous, en fait la nomeclature et les bases de remboursement établis par la Sécurité Sociale, fixaient, en dehors d'une minorité de chirurgiens restés véritablement maîtres de leurs honoraires, les taux habituellement appliqués. Si le standing de la profession restait dans l'ensemble satisfaisant, grâce à la grande activité des chirurgiens dans nos divers centres, c'était par le nombre des actes effectués plutot que par le chiffre des honoraires demandés, qui, dans l'ensemble, s'étaient considérablement dévalués. Mais, en règle générale, nous avions réussi à éviter le tiers payant et les tarifs rigoureusement opposables.

Une évolution se dessine actuellement, marquée par des réformes en discussion, qui tend à modifier tout cela.

Sur le plan de la chirurgie du "praticien"—je veux dire des chirurgiens exerçant en clientèle de ville, hors des centres universitaires—une tentative a été faite pour fixer un barème rigide et opposable des honoraires, n'admettant aucune catégorisation ni dérogation suivant la situation de fortune de l'opéré, n'admettant que quelques dérogations fondées sur les titres du chirurgien. Cette tentative, connue sous le nom de projet de Loi "Gazier," n'a pu, jusqu'ici, aboutir, grâce à la résistance du corps médical unanime. Elle sera certainement reprise sous une forme plus ou moins modifiée.

Sur le plan des Hôpitaux non Universitaires, c'est sous la forme du "plein temps" imposé qu'existe la menace. La conception de l'activité plein temps à l'Hopital, dans nos sphéres dirigeantes et dans nos milieux de Sécurité Sociale, n'est pas en effet celle d'une activité hospitalière étendue à l'ensemble de la journée de travail—admise comme une nécessité par beaucoup—mais celle de l'activité "exclusive" à l'Hopital, avec interdiction de traiter, aux heures de liberté, des malades en ville (sous réserve de l'existence d'un petit secteur privé accordé dans l'Hopital même aux chirurgiens). Cette conception rigide, beaucoup plus rigide que celle appliquée aux chirurgiens même en URSS (leur travail à l'Hopital fini, ils sont libres de leur activité pendant les autres heures), est codifiée par des textes récents et déjà appliquée dans quelques centres, ainsi qu'en Algérie dans tous les Hopitaux non Universitaires. Elle aboutit, en fait, à une fonctionnarisation déguisée du chirurgien hospitalier.

Sur le plan de nos villes universitaires, une ordonnance récente, à côté de la fusion du recrutement universitaire et du recrutement hospitalier, jusque là séparés, et du caractère national donné à ce recrutement, vise à imposer aux chirurgiens des Hôpitaux, Maîtres de conférence ou Professeur, cette même conception du "plein temps," activité exclusive à l'Hopital, et à fonctionnariser en fait, avec quelques légères dérogations, la profession du chirurgien hospitalier enseignant. Les décrets d'application de cette ordonnance sont en préparation, et son entrée en vigueur est prévue pour fin 1960s.

C'est donc plus qu'une tendance, c'est une volonté de réglementation étroite et rigide, qui vise à supprimer le caractère libéral de la chirurgie pour un grand nombre de ceux qui font de la chirurgie hospitalière, à tous les degrés, tandique la chirurgie dite "libre" serait soumise à une tarification de plus en plus rigide et opposable. Il est évident qu'une longue période de transition précè à dera l'application réelle et généralisée de telles mesures, mais il n' est pas moins important

de notre l'évolution qu'elles marquent dans un assez proche avenir.

De cette rapide et très incomplète revue des conditions actuelles de l'exercice de la chirurgie dans un certain nombre de nos pays d'Europe Occidentale, il ressort donc nettement que, pour des causes multiples—dont certaines tiennent à l'évolution même de la technique chirurgicale et d'autres à celle de l'état social et politique—la liberté et l'indépendance du chirurgien sont, à des degrés divers, partout menacées—tandis que, globalement, son "standing moral" et matériel" est, pour le plus grand nombre au moins, abaissé. Il est évident que partout subsistent des restes de son ancienne grandeur, mais que, si la situation d'un certain nombre de grands maîtres reste provisoirement intacte, il n'en est déjà plus de même pour l'ensemble du corps chirurgical, et l'on peut légitimement penser qu'avec l'évolution qui se dessine et la montée des jeunes générations soumises au nouveau régime, avec la pléthore qui dans certains pays rend plus facile aux pouvoirs publics la réalisation de leur plan, dans un avenir assez proche il ne subsistera pas grand chose de la profession telle que nous l'avons connue: subordination administrative, traitement fixe de fonctionnaire ou tarification imposée des actes, tiers payants souvent dans ce dernier cas, tel est l'avenir matériel—tandis qu'une dépendance de plus en plus grande à l'égard de l'état ou des grands organismes collectifs, sera par ailleurs la conséquence de l'importance des organisations et de l'équipement technique nécessaire—et que seules les puissances financières auront les moyens d'assurer. Et une telle évolution a bien des chances d'être irréversible, en raison de ses causes profondes. Nous devons en prendre conscience, et poser en face d'elles, la question de l'avenir de la chirurgie dans un tel climat.

Il est nécessaire, pour essayer de prévoir objectivement dans quel sens cette évolution risque d'influer sur cet avenir, de nous demander quelles sont les conditions qui commanderont demain l'avenir de la chirurgie, et dans quelle mesure l'évolution nouvelle des conditions d'exercice agira favorablement, ou défavorablement sur la réalisation de ces conditions.

Deux grands facteurs semblent, en définitive, être la condition de cet essor futur de la chirurgie: l'un est la réalisation de conditions d'organisation et d'équipement correspondant aux impératifs techniques de la chirurgie moderne, et de la recherche chirurgicale qui en est inséparable—l'autre la qualité de la sélection des hommes et le climat psychologique dans lequel ils travailleront.

Il parait incontestable que, pour la réalisation de la lère de ces conditions—organisation et équipement — l'évolution actuelle peut être favorable. L'intervention de plus en plus large des pouvoirs publics, de l'état, ou des grands organismes aux quels il délègue ses pouvoirs et qui possèdent les moyens financiers, est une nécessité. De plus en plus, les conditions techniques de la chirurgie moderne, conduisent à la concentration de celle-ci en de grands hôpitaux, munis de tous les moyens puissants d'équipement et de recherche. Si des organisations privées doivent subsister (et il est souhaitable qu'elles subsistent), ce ne sera que si elles disposent elles aussi de movens financiers puissants, et sous condition d'un contrôle technique qui ne permettrait pas le maintien d'organisations vétustes et inadaptées. Il est par ailleurs une hiérarchie nécessaire des établissements de soins chirurgicaux; une répartition nécessaire sur le territoire de chaque pays, pour répondre aux besoins de la population—une coordination indispensable entre les diverses organisations pour éviter ici des gaspillages et des doubles emplois, coexistant avec de grandes insuffisances ailleurs. Il faut, pour permettre d'utiliser cet "armement chirurgi-

cal" dans chaque service, des équipes chirurgicales comprenant tous les éléments nécessaires, venus des disciplines diverses—et il faut faire vivre (même en travaillant "à perte," si les besoins du malade et de la recherche l'exigent: il ne s'agit pas ici d'une entreprise commerciale)—tous les membres de cette équipe—les jeunes en particulier — sans qu'on puisse avoir la sensation que certains sont exploités au profit des autres. Tout cela demande aujourd'hui une organisation, un effort de coordination, des plans d'ensemble que seule l'autorité supérieure peut réaliser—et qu'elle peut réaliser bien, sous condition qu'elle n'y apporte pas un esprit bureaucratique et les conceptions d'un "planisme a priori," et qu'elle s'entoure des conseils techniques nécessaires. A tous ces points de vue, l'évolution actuelle de la conception "chirurgie service public" peut être un bien, et peut présenter d'incontestables avantages, être appelée à se développer pour le bien des malades et apparaître comme indispensable pour assurer l'avenir de la chirurgie. Il ne serait plus concevable de rêver d'un travail en ordre dispersé, anarchique, seul possible à l'aube de la chirurgie, mais qui serait aujourd'hui inadapté aux actuels besoins.

Mais cette organisation nécessaire, conditionnée par l'intervention des pouvoirs publics, cesserait d'être un bien et risquerait de devenir un grave danger pour l'avenir de la chirurgie, si elle aboutissait à instaurer un dirigisme d'esprit étroit, un autoritarisme sans nuance, et si au lieu d'être animée par le seul mobile de l'intéret général et des besoins de la technique moderne, elle méconnaissait la nécessité fondamentale de garder à l'exercice de la chirurgie son attraction sur les élites, en permettant les conditions d'une sélection valable, en assurant aux chirurgiens un avenir qui réponde aux légitimes ambitions de ceux qui s'orientent vers cette carrière—en ne les réduisant pas à devenir de simples artisans spécialisés, ou des fonctionnaires placés dans une position matérielle et morale médiocre. Là est le danger de certaines mystiques, d'une mentalité de suspicion et de méfiance à notre égard des pouvoirs publics, comme de certaines conceptions bureaucratiques de l'organisation de la Santé Publique, risquant d'aboutir à des effets stérilisants.

Comment alors concilier les impératifs nouveaux nés de l'évolution technique et de l'évolution sociale, avec cette nécessité, si l'on veut la qualité de la chirurgie dans l'avenir et son essor, de respecter la personnalité du chirurgien et de provoquer la vocation chirurgicale chez les meilleurs? Là est toute la difficulté du problème, il se pose au stade de la sélection, d'abord, et au stade de l'exercice, de l'application des règlementations et des con trôles légitimes.

La sélection, d'abord. Qu'il s'agisse simplement de l'autori sation d'exercer la chirurgie, ou du choix de eeux qui l'exerceront dans les Hôpitaux publics, le problème, résolu de façon très diverse suivant les pays, donne lieu à des discussions multiples et passionnées.

Faut-il exiger un diplome spécial de chirurgien, au delà du diplome de Docteur en Médecine? C'est un premier point de discussion. Il est certain que, devant la complexité des techniques modernes, et l'étendue des connaissances spéciales demandées aujourd'hui aux chirurgiens, l'omnivalence autrefois admise du diplome de Docteur en Médecine se heurte à des arguments valables. Mais, par ailleurs, si l'on entre dans cette voie, où faudra-t-il s'arrêter? Devant la multiplication des spécialités chirurgicales, la complexité de leurs techniques particulières, il deviendra logique d'exiger un diplome d'urologiste, ou de neuro-chirurgien ou d'orthopédiste? Et si ce diplome (comme l'agrément de certaines commissions en certains pays) n'est exigé, pour l'exercice de la chirurgie, que lorsqu'il s'agit de soins donnés aux assurés sociaux, quelle justification pourra-t-on donner d'une décision qui exige certaines garan-

ties pour une partie de la population, non pour les autres malades? En fait, nous avouons, personnellement, n'être pas partisan d'une multiplication des certificats ou des diplomes, de valeur souvent plus théorique que pratique. Là comme ailleurs, il nous parait qu'un contrôle moral à l'intérieur de la profession serait bien préférable. Ne pas défendre d'exercer, (les limites de l'exercice permis étant alors difficile à préciser)—mais assurer à ceux qui, aux yeux de leurs pairs, présentent les garanties de compétence et de moralité professionnelle, la caution d'un organisme qui serait une sorte de "Collège Supérieur de la Spécialité," composé de personnalités indiscutées. Le "Label" donné par ce collège aurait une autre valeur qu'un diplome ou un certificat de plus. Et rien n'empêcherait, dans l'Europe unifée de demain, ce collège de prendre le caractère d'un organisme international, dont la caution aurait même valeur dans nos divers pays. Ce contrôle "interne" de la profession, qui s'exercerait sur les hommes et aussi sur les organisations hospitalières, sur leur fonctionnement et leur rendement—aurait une autre valeur que des contrôles administratifs et des règlements rigides et aveugles. Il serait accepté de façon infiniment plus facile, les indignes seuls pouvant le redouter. C'est une organisation de cet ordre (un peu à l'image de ce qui existe déjà dans les pays anglo-saxons) qui nous semblerait la meilleure garantie aux yeux des malades et des pouvoirs publics: l'idée a été lancée, recemment, en France, pour l'orthopédie, de créer un Collège de ce type au sein de la Société Française d'orthopédie et de traumatologie Elle mérite, pensons nous, d'être étudiée sur un plan plus général.

Un deuxième problème, plus particulier, est celui de la sélection pour l'attribution des fonctions chirurgicales hospitalières (et parfois, en même temps, universitaires). Résolu de façon très diverses suivant les pays, suscitant des discussions toujours ouvertes entre les partisans du concours et ceux du choix sur titres, ou de la désignation par les administrations responsables, il a fait, en France en particulier, couleur beaucoup d'encre. Il est certain que les solutions peuvent varier, et avoir une valeur différente suivant le tempérament national, suivant les traditions, suivant le caractère "étatisé" des institutions hospitalières, où l'existence d'une concurrence entre des organismes divers. J'exprimerai simplement l'opinion que le concours, s'il doit être adapté à l'évolution de la chirurgie moderne, et me parait devenir stérilisant par le maintien de formes surannnées, ne me parait nullement mériter les critiques faciles dont on l'accable souvent injustement—et que sa valeur d'émulation reste grande, de même que les garanties qu'il donne contre l'intervention de facteurs extra-professionnels. Mais, quel que soit le mode de sélection adopté, l'essentiel nous parait être qu'il soit de nature à provoquer les ambitions légitimes, en assurant à ceux qui seront choisis une position morale et matérielle digne de l'effort accompli.

C'est en définitive des conditions d'exercice de l'activité chirurgicale que dépendra, en effet, la qualité de cette sélection, suivant qu'on stérilisera ou qu'au contraire on excitera le recrutement par l'attrait de la profession. Celui-ci dépendra sans doute pour une part des conditions matérielles: la dévaluation progressive et assez générale de notre profession est, incontestablement, un danger pour la sélection de l'avenir, et cette nécessité de maintien d'un standing matériel suffisant doit être comprise des pouvoirs publics, s'ils ne veulent pas demain un abaissement progressif de la qualité des chirurgiens. Mais, plus encore, c'est le standing moral qu'il faut maintenir: à ce standing moral, l'évolution actuelle trop fréquente vers une étroite subordination, vers une règlementation

stricte, vers l'installation de contrôles abusifs et vexatoires, vers une fonctionnarisation sans éclat, vers l'uniformisation des situations et le travail "à la chaine"—risque de porter un coup fatal.

Comment concilier alors cette nécessité —évidente à nos yeux—de maintenir un climat "libéral," avec celle, également évidente, de permettre aux organismes d'assurances et d'assistance de remplir leur mission, qui exige nomenclature, codification et contrôle? C'est là un problème difficile. La solution, là encore, nous parait être l'appel au "gouvernement intérieur de la profession organisée." Au lieu d'une règlementation venue d'en haut, et conçue souvent d'une façon arbitraire et sans souplesse ni nuances, on pourra ainsi aboutir à des accords collectifs librement consentis et dont le respect sera assuré par le corps médical lui-même. Tenant compte des nécessités sociales, ces accords permettront la couverture totale des soins donnés à ceux dont la situation matérielle le justifie, mais ne sauraient instituer pour tous une chirurgie "à prix fixe," ne tenant compte ni de la qualité de celui qui la fait, ni des possibilités de celui qui en reçoit les bienfaits. Il faudra, certes, une "nomemclature" des actes chirurgicaux, mais elle doit être un guide fixant à larges traits des catégories essentielles d'actes de soins, et non, comme trop souvent cela existe, un catalogue d'épicier. Il faudra des médicins contrôleurs, mais il faut faire de ces médecins contrôleurs un corps indépendant, comme celui des experts, et non des fonctionnaires dépendant des caisses ou des organismes similaires. Dans l'organisation des Hôpitaux Publics, problème spécial très complexe, il faudra réaliser les réformes de structure, qui, par l'attrait du travail hospitalier exécuté dans les conditions techniques les plus favorables, par les possibilités données à la recherche, par les avantages donnés à ceux qui s'y consacreront avec enthousiasme et ferveur, rendant inutiles des interdictions ou des contraintes humiliantes. Et, dans cette organisation, il faudra penser tout spécialement à assurer position honorable et un standing vital suffisant aux jeunes, chirurgiens de demain, dont dépendra l'avenir de notre art.

Je ne puis m'arrêter plus longtemps sur tous ces problèmes—mais demain, peut être, du fait de la réalisation de l'Europe unie, il deviendra nécessaire, dans notre profession comme dans d'autres, d'unifier dans une certaine mesure nos législations, de coordonner nos modes d'activité, de demander des garanties communes de la qualité de ceux qui l'exerceront. Suivant la notion plus ou moins claire que nous aurons des impératifs d'avenir de la chirurgie, nous pourrons, par notre action commune, commander le sens de cette adaptation. Il Importe donc que nous sachions à la fois ne rien méconnaitre des nécessites inéluctables d'une évolution commandée par les besoins techniques et par les besoins sociaux—et chercher des solutions qui concilient cette évolution avec le maintien du caractère libéral de l'exercice de la chirurgie—condition pour moi nécessaire de son essor futur et de sa qualité.

A sharp retort from a polite person, in a high-pitched voice, is bad; in such cases, there is retraction of the hypochondrium.

—*Hippocrates*

Editorials

The University and Society

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THE subject of this paper, "The University and Society," is not original. It covers vast ground and has given rise to endless discussion. Nevertheless it is perhaps more topical today than ever before. It embraces so many problems for which there is no definitive solution, particularly in this age of varying political systems, social structures and attitudes toward the university as such. None the less, whatever the difficulties involved, these problems require our serious and continuous consideration in this era of rapid transition, when the searchlight of public attention is trained on our universities. I shall confine myself here to a few of these questions, some of them general, some of special interest to the medical profession and some colored by experience in my own country.

There was a time when our institutions of higher learning were concentrated on instruction rather than research; when the researcher was a lone wolf, by necessity an ascetic, whose work and discoveries were recognized as valuable only as they served the purpose of waging war. Archimedes enjoyed fame for a brief period when his inventions were applied to the defense of Syracuse, and it is said of Leonardo de Vinci that, in appealing to the Duke of Milan for support, he made much of his contributions to the art of fortification and mentioned only in passing that he could also paint a little!

The discoveries of a Leonardo, a Galileo or a Newton were but the first buds of a scientific flowering that is yet in its early spring. Its intellectual and material fruits are still matter for speculation, unfortunately not always rosy.

In the short span of two centuries during which science has influenced men's thinking, it has completely revolutionized the attitudes of educated mankind. Science is primarily responsible for the rapid and continuous transformation of society.

Science itself has changed character in many important respects. Marx foresaw this when he stressed the point that the philosophers interpret the world in different ways, but the real problem is to

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change it. From being a means by which a man could study the world around him, science has become a tool to transform it. Research is no longer the poor relative, supported by charity as a balm to our cultural conscience; it has achieved status; is more purposeful and can be carried on in a more favorable climate. The universities have grown during the last few decades into great and complex institutions, and today there are few universities in the western world that are not dependent on continuous and extensive financial support from the authorities.

All over the world the years since World War II have been characterized by a steady increase in the number of university students; the numbers of applicants are even greater. In some cases admission is free and unrestricted, the institution's only requirement being evidence that the applicant has a certain educational background, usually in the form of a school-leaving certificate. In some countries, or at least in some faculties, restrictions are imposed for material reasons—shortage of laboratory space, technical equipment and the like. In practice, if not in theory, the influence of society on the university is felt even at this stage; for, as it admits new students, the university automatically assumes a responsibility to society — the intellectual preparation of society's potential leaders. Society, like the university, poses the question: "What is the present and the future demand for graduates?" Estimates of this demand tend to be exaggerated by society at large and underplayed by professional groups.

University admissions can be restricted in various ways. In general, though, all restrictions are unreliable. There is no infallible method of selection. In Sweden we admit medical students on the basis of school grades, but many of us doubt the wisdom of this system. School grades are evidence only of certain intellectual capacities, particularly the receptive ones. Other characteristics, including the student's inner fire, his energy, his adaptability and his reaction to setbacks and frustration, are not taken into account. In this connection, I should like to quote an old saying: "Ten men have failed because of a moral deficiency, a defect in character, where one has failed from an intellectual deficiency."

As for medicine, I doubt that there are any good reasons for restricting admission. Although the English say there is nothing so dangerous as a hungry doctor, I don't think there is much risk of this in the foreseeable future. This generation is only at the beginning of a great era of research in medicine. To this assembly, I shall mention the great demand for facilities for clinical research; the less well developed countries can absorb as many physicians as we can produce, and that in our own countries systematic health control will substantially increase the demand for doctors. In general, the increasingly complex social machinery can be expected to create many medical problems and new functions.

According to statistics, the number of students in Sweden who drop out during the course of their studies is much higher in those institutions in which no selection system operates. Nevertheless, I cannot see it as a tragedy if the university does not return every young man and woman to society as a graduate. Many Swedish journalists, authors, actors and artists have spent some years at a university without graduating. I do not believe that they themselves consider the time lost, nor should society. Society needs people with the greatest diversity of intellectual training.

Society on the whole constantly needs more graduates than our universities can

produce if they are open only to the most brilliant and to the financially well-situated. This brings us to a grave economic problem, of importance also to society. The majority of students—at least in Europe—require financial aid, directly through grants, scholarships or loans, indirectly in the form of board and lodging, health services, and so on. The methods of handling these problems vary according to tradition, the economy of the country, and psychic factors. Now and again student groups demand that the government pay them a salary during their years of university study, regardless of their individual financial situation. Responsible student bodies in Sweden and elsewhere, however, usually oppose this form of aid. The consequences of a wage system would be serious for the government and still more so for the universities and the students themselves. The government would soon insist on even greater control of curricula and supervision of the students' pace of work, and the demands for achievement would become ever more stringent. This would mean the loss of the autonomy, the freedom, which through the centuries has been the great asset of the universities and which is still respected despite the growing financial responsibility assumed by our government.

Our student bodies grow, but our teaching staffs do not increase proportionately. We must ask ourselves whether the universities are not in danger of defaulting in certain of their duties to the students and thus, indirectly, to society.

The teacher-student ratio is decreasing. At the same time, there are growing demands on the teacher in the form of constantly increasing subject matter and intensified research. In my own opinion the unsatisfactory contact between teachers and students is to some extent rooted in the methods employed for recruiting teachers. The professors are generally selected purely on the basis of their scientific qualifications. In Sweden we are fortunate in enjoying high scientific standard. When we appoint teachers we pay little if any attention to other qualifications, such as "teaching skill." And it cannot be denied that many of our professors regard teaching as a burden; this attitude is not seldom reflected in their teaching.

In addition, the teachers carry too heavy a load of administrative duties—certain aspects of university administration are still medieval, thanks to lack of comprehension on the part of the authorities. As a result of these various factors, the teacher does not have enough time to devote to intellectual guidance of the students and no time at all for dealing with his personal problems. I do not mean that scientific qualifications should not be of decisive importance in filling the top positions, but professors should not be burdened with administration and routine teaching assignments. "If truly significant scientific results are to be achieved, we must acknowledge the special quality of the researcher and allow him a measure of freedom that is rarely accorded elsewhere in society; and in spite of this we must also bear in mind our responsibilities to our students. I believe that much could be gained by strengthening our administrative departments and even more by increasing our staffs of junior instructors and emphasizing teaching ability in their selection. In these days of feverish scientific activity, I am haunted by the unorthodox thought that perhaps we might prepare a better harvest for the future if the occasional teacher showed more interest in the students and the odd scientific paper remained unwritten.

In my youth there was not the same scientific production; resources were

small, researches few. Financial conditions are more favorable nowadays. Today research—I am thinking in terms of medicine—is the fashion. But does everyone have to try his hand at it? Does everyone have the researcher's talents? In my country, where the number of physicians per capita of population is not high, and there is a shortage of doctors in the rural areas, the university hospitals are crowded with young graduates. I have the impression that in the mind of the young doctor the patient is often secondary in importance to the theoretical problem he represents. Older physicians and surgeons are largely responsible for this; they are forcing specialization, training specialists almost from the very beginning of medical training.

In discussions about the work load of professors the question frequently arises whether university staff members should take on assignments outside their institution, serve on government and other committees, be active in professional organizations and private enterprise, or engage in extramural teaching activities. In my opinion, this trend is on the whole a good one. In ancient and more autocratic times, the universities were small, and their existence depended to a great extent on the relations between the individual ruler and the governor of the institution. The role of the professor was primarily that of the teacher; research was his hobby. The academician was often looked down upon socially, and he not seldom responded with an attitude of isolationist intellectual snobbery. Universities today are vast, complex institutions, and it has become more and more important for their representatives to go into the market place to plead their cause, to explain their needs, and in general to advertise their existence in a manner consistent with modern public relations.

At first the reader may find what I have said a little controversial. It is not. The universities will have to widen the field of activities, but by doing so we shall not put the burden of it solely on the researchers.

If we are to have more generous university budgets, we must see to it that our legislators are kept informed of our real needs and that these claims are supported by facts and figures. As a living organism, the university is greatly dependent on impulses from the world around it. And even if the scholarly concentration of certain faculty members is interrupted by breaks in the relative isolation of the university, I believe that they themselves, as well as their institutions, will benefit from a broader contact with the nonacademic world. In my experience, the risks implicit in research projects initiated and subsidized by the government have been exaggerated; indeed, I have seen this type of program, entrusted to the right people, result in fruitful basic research. I also find it difficult to believe that this mixture of outside interests represents a danger to the independence of the university. Closer relations between the university and the public would undoubtedly be a desirable counterbalance to the ever-stronger trend toward specialization.

The development of our universities has favored the natural sciences, which are characterized primarily by technical specialization and thus fragmentation of knowledge. Each professor knows "more and more about less and less." They say, that the day of the monograph is past. But is it not a pity that so few of us dare devote ourselves to the coordination and integration of the works of other specialists? Detailed research is often overestimated; at the same time, enthusiasm for it has infected our young people. This is a thing that may have unfortunate respercussions in the future.

All this brings me back to the important question of the responsibility of the university to its students. Once the universities were a center for *studium generale*, but gradually they have changed, enlarging their field of activities and developing facilities for research and vocational training. There is no room any longer for *studium generale*, for the humanities. The number of disciplines grows; the subject matter in each field increases, and society demands more and more graduates and frequently urges intensification, that is to say shortening, of study programs. The students are under constant pressure to finish their studies as quickly as possible. Other factors may play a part, but the universities themselves are chiefly responsible for this pressure on the students.

In the autumn of 1959 the freshmen in a Swedish university were urged by a representative of the institution to "get off to a flying start." This I consider fundamentally wrong. Isn't there danger that the continuous pressure we put on our students will quench the enthusiasm and initiative they are sure to need later in life? Should we not, as far as financial conditions permit, try to prolong the years of youth? Soon enough come the ties that bind us to routine.

Let us not overburden our curricula. Let us allow the students leisure for other interests. Let us give them of our own time and interests.

Medicine has become a technologic science. We graduate technologically-minded young people. But are they not, because of this very technologic training, indifferent to the great social problems? Do we really produce men with a balanced sense of understanding? Are they not in danger of living their lives in the backwaters of the main stream? I am convinced that too early and too rigid specialization must be counterbalanced by broader and more prolonged exposure to the liberal arts. The cultural tradition of a people is rooted in its classics, its heritage of that beauty which has survived the centuries. Our task, therefore, is to leaven professional training with the fundamental and universal values cherished by our people. I believe that there is an organic link between natural science and the humanities, and if we neglect the latter we endanger the scientific bent that was the offspring of the Renaissance. I also believe that the humanist gains from a better grasp of the biologic context and that the horizons of both natural scientist and humanist are widened from contacts with each other's worlds.

Technology is a tool; it must not become a master.

Shortly after the war, here in Chicago, I had the opportunity to discuss university problems with an old colleague, a member of a medical faculty. I asked him: "On the basis of your long experience as a university teacher, in which respect, to what degree would you like to see the medical g r a d u a t e teaching changed?" Without much hesitation, he replied: "I want to see more of the great books." My friend touched on a problem of vital importance just now. At about the same time, another scholar expressed his view in these words: "I want to see more educated B.A.s and fewer uneducated Ph.D.s."

We live in a progressive age: we have devoted most of our time to achievement. Should we not endeavor to bring to the students entrusted to our care the realization, forgotten by many of us, that a human being can never be judged by his achievements only, that it is his personality that counts, his manner of being; that the man is always greater than his work? Should we not encourage our students to

nurture the precious ability to live their own lives as they see fit, to have the courage to take time for contemplation, for the appreciation of what appeals not only to their intellect but to their emotions, their sense of beauty? We need to return to that savor of life which, some few years ago, was so nicely expressed by the old Swedish craftsman who closed out business one beautiful spring day and put a sign on the door of his workshop: "Closed from hawthorn to lilac blossom time."

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The History of Gastroenterology

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I HAVE been preparing for this task for many years. I grew up in medicine. About 1890, when I was six, I helped my father perform an operation on the kitchen table in the back yard of our home in a village in Hawaii. Mother was "clean nurse"; I was "dirty nurse," and the native Hawaiian minister gave the anesthetic—the first one he'd ever heard of in his life. He did very well; the patient survived, and that was something.

On a recent visit to the International Surgeons' Hall of Fame in Chicago, as I looked through the fine collection of old roentgen tubes, I thought of the struggles I used to have with such erratic tubes in the years from 1904 to 1913, when Coolidge made his great discovery. As a few of our older surgeons can remember, the old tubes, when in use, were always "running down" and getting so "soft" that their output of rays was poor.

In 1910 I joined one of my teachers, the most brilliant man in San Francisco, and started my training as a gastroenterologist. Since then I have lived with the advancements in this specialty. For many years I edited the two leading American journals on gastroenterology.

For a few minutes I should like to go back to the Old Stone Age, for I have always been a student of prehistoric man. I suspect there were dyspeptics in those days, and if there were they doubtless tried many diets. Their wives and their mothers-in-law surely told them what not to eat. Surely, also, the patients tried on themselves a number of herbs and laxatives in the hope of relief.

In ancient Egypt there were specialists; hence there were probably gastroenterologists even in that ancient time. Doubtless there were people who became constipated and took laxatives and purges. As is well known, the Ebers papyrus is an ancient book of prescriptions. In it we find mention of familiar drugs, such as opium and castor oil. The ancients knew also of magnesia, which was named after the city of Magnesia in Asia Minor. The old Greeks

During the months of 1960 and as long thereafter as possible, the editorial pages of the Journal of the International College of Surgeons *will be honored by presentations of rare and extraordinary historic value, the lectures presented at the International Surgeons' Hall of Fame on medical and surgical history from the earliest recorded achievements to those of our own times. We believe that* Journal *readers who were not able to attend the lectures will find them as exciting as did the audiences present at their delivery. The story of progress in the healing arts and the giants of medicine and surgery to whom we owe the amazing brilliance and scope of modern achievements is intrinsically thrilling and is a vital part of the education of every cultivated man and woman, inside or outside the profession. It is altogether fitting that it should appear in these pages, since the International College of Surgeons is first, last and always a teaching institution.*

used for purging a drastic and powerful drug called hellebore. In the time of Hippocrates people had the idea that purges were needed to drive out of the body what they called peccant or harmful humors—fluids that were supposed to be poisoning the person. In those old days even a healthy person like me, having to give a lecture, might feel the need for preparing himself by taking a big dose of some purgative. He would assume that this would make his brain much brighter. We are told that Zeno, the Stoic, when he had to meet another philosopher in public debate in Athens, first purged himself with hellebore.

Some of us are old enough to remember that our grandmothers used to give us a big dose of calomel and treacle in the Spring. I am glad to say my mother neglected this custom, but I imagine my grandmother followed it. I can remember that in my early days of practice, some fifty years ago, there were people who came to me and said they wanted to pay me a fee just to get my opinion as to whether they might purge themselves that Spring. And I would talk to them seriously for a while and then say, "Yes, if you'll do it on the twentieth of the month; but be careful; don't do it on any other day." Then they would go home happy. I fear a little hocus-pocus has always been mixed up with medicine!

For many years I collected a library on medical folklore and found that always, and even in the most ancient times, there were two types of doctor in every community. There was the witch doctor (and he was the more respected and feared of the two, with the most power and authority), and there was an herb doctor, with his pouch full of medicines. He might also be a bone-setter. If someone got his shoulder out of joint, the bone-setter would put it back in again.

When I was a little boy in Hawaii we had several types of native doctors called Kahunas. One was a nice old herb doctor; one was a bone-setter, and one was an expert masseur. Then there was a dangerous fellow who, for a fee, would kill anyone with his witchcraft. I am reminded of the Chicago gangster I once had as a patient. When he got well after an operation, he was so very grateful and so anxious to show his gratitude that he said, "Look, Doc, if there's anybody you'd like rubbed out, maybe a mother-in-law or somebody like that, just let me know, and it won't cost you a cent."

In the old Hawaii I knew, if a man began fooling around with another fellow's girl, all the fellow had to do was go to a Kahuna and, for a fee of perhaps two pigs he could have his rival "prayed to death." All the Kahuna had to do was to send word to the man that he was working magic on him; the fellow would sit down on his mat, and in a week or two he would be dead.

But to get back to the custom of purging. In a certain state mental hospital, up to a few years ago, every patient every night got a dose of salts, whether he needed it or not. In 1905, when I was an intern, every patient whose bowels hadn't moved that day would get a dose of salts. Many surgeons can remember how, in the days of their internship, they walked every evening down the ward with the nurse, ordering "mag sulf" for one poor devil after another. Some interns prescribed the awful compound cathartic pill, which was popular in that day.

In 1902, when I was a freshman, returning from San Francisco on a steamer for the first time in my life, I found myself constipated; so I went to the ship's doctor and said, "Would you mind giving me a mild laxative?" "Certainly," he said, and, reaching into a drawer, he handed me three good-sized pills, saying "Take these." Fortunately I took only one, because, with that, I was "sick as a dog"

and very busy for two days. How I suffered! That doctor had given me compound cathartic pills. If I had taken all three. . . .

Not content with purging, in the old days doctors often gave a patient with stomach trouble an emetic. That cleaned him out upward as well as downward. The emetic had the great advantage of making the patient so sick that he forgot what he had gone to the doctor for. That was a great advantage—it took the man's mind off his disease!

I have often wondered how primitive man discovered the value of the many herbs. Until recently chaulmoogra oil was used for leprosy, and it *did* clear up the skin of an occasional leper. What I wonder now is, how did some old herb doctor discover that this rare and unusual oil was good for leprosy? I suspect that drugs were found during great famines, when, as in China and India, people by the millions were starving to death. They ate every leaf and root and fruit that would assuage their hunger a little. In this way they discovered poisonous plants, laxative ones, nauseating ones and healing ones. The old herb doctor found drugs that would relieve flatulence, abdominal pain or diarrhea. Doubtless in very early times men discovered the pain-relieving properties of opium. We have pictures of people gathering poppy bulbs in the Middle Ages. When the Spaniards arrived in South America they found the Indians using ipecac, which is one of our best emetics even today.

Now, to go back for a moment to the Ebers papyrus, that book contains a prescription for a soothing syrup to be given to a child. And what does it contain? It contains opium, just as Mother Winslow's Soothing Syrup used to contain opium. But here's a strange fact—in the Ebers papyrus the prescription calls not only for the opium but for "fly specks off the wall." Now why the fly specks? As I remember, practically every prescription in the Ebers papyrus contains an effective drug, like magnesia or caster oil, or opium, plus the dung of some animal—the dung of a pig or of a hippopotamus. But why the dung? I studied that question for many years, until I was satisfied that the opium was put in by the herb doctor and the dung by the witch doctor. It was put there to disgust the devil in the person's body—the devil who had got in and "possessed him" and made him ill. On tasting the dung, the devil might get sick and leave the man's body, and then the fellow could get well.

I remember reading some years ago in a newspaper that an Indian medicine man up in Alaska, trying to cure a patient's bellyache, jumped up and down on his abdomen in order to drive the devil out. Unfortunately, all he did was to burst the poor fellow's appendix, so the result wasn't very good. As I said before, everywhere we go in the ancient or modern world we will find two types of doctor, one a true physician and the other a dealer in hocus-pocus. One gives medicine, and the other drives out the devil. In Los Angeles recently I saw a scientific obstetrician confining a woman, while in the next room sat a Christian Science practitioner giving the woman "treatments." The patient was having both types of medical treatment.

Primitive man probably discovered that cooked food is easier to digest than is raw food. Probably, a neolithic mother with a sick child discovered that he did better on a mild, soft diet. Hippocrates tells us that for the sick certain foods had been found more digestible than others. The ancients learned to recognize a number of intestinal worms, and then they found some drugs that would cause the worm to leave. How did they find them? Well, I can give you an idea. Once, in my early days of prac-

tice, I had as a patient a mining engineer with a tapeworm. Several times I had tried to get the head of that worm, and always I had failed. Then, one day, in came the man with a grin all over his face. He said, "I got him—the whole worm." I asked, "How did you do it?" And he said, "One day I came in off the desert, so frantic for fluid that when I reached a town and saw a little keg of iced root beer, I bought the whole keg, and drank the beer right down. And that worm crawled right out, head and all—he just didn't like root beer!" So that's the way a number of drugs have been discovered.

The ancients early noticed the marked effect of emotions on the stomach and bowels. Those who know their Homer know how tremendously emotional those old Greeks were. One can easily imagine that at times their emotions would upset their stomach and bowels and produce borborygmus. Probably, as a result, the ancients decided that the soul must be in the abdomen. Look in an early edition of the Bible, and you will read that "Joseph's bowels did yearn upon his brother." Or you will read of "bowels of mercy" and bowels of this and that. Today, in the revised version, "bowels" has been changed to "heart." But still we say of a brave man that he has guts. When I was a boy in Hawaii, the Hawaiians—2,000 miles out there in the middle of the Pacific —had the same idea. The kindest thing that you could say about a man was that he had an opu nui—a "big abdomen," i.e., plenty of guts.

The ancients had another curious idea, that the liver and spleen would affect a person's temperament. Today we may say of a man who pushes himself forward, "You have your gall." We say, also, of a bad-tempered man that he is choleric. In Greek the root *chole* means bile, and in English choler used to mean anger. In Spanish, cholera means both jaundice and an attack of uncontrolled anger. I remember a German physician who kept records of people who had gallstones and found that in a third of the cases a colic followed an attack of violent anger. The ancients thought the spleen also could cause a bad temper, and even today we speak of a "splenetic man." The diaphragm was supposed to influence the mind—hence our word *frenzy*.

When did men begin to get a correct idea as to how food is digested? About 1750, Reamur showed that gastric juices taken from a bird, the kite, would digest meat. Soon after, Spallanzani, an Italian priest, also spent years showing that the gastric juice of birds would digest meat. Still later, in 1803, Doctor Young of Maryland showed that the gastric juice is acid. In 1824 Prout, an English chemist, showed that the acid is hydrochloric acid. Then, as everyone knows, about 1825, Beaumont, the backwoods physiologist, as Osler used to call him, worked with Alexis St. Martin, a Canadian guide. A gun had gone off and had blown a hole in St. Martin's side, through which Beaumont could look into the man's stomach. Beaumont studied the movements of the stomach and the juice that formed in it. He observed that when Alexis was angry or depressed or had a cold the mucosa would change in appearance and acquire a coat of mucus. As may be remembered, Beaumont had a hard time with Alexis St. Martin. The man did not like being studied, and every so often he would run away.

About 1836, Purkinje and others began to study the digestive action of the pancreatic juice. In 1664 Regnier de Graaf published a picture of a fistula—a dog with a little balloon on the end of a tube from which pancreatic juice was coming out. Later, Pavlov and others were to make much use of such dogs.

In 1896, my dear old professor of Harvard days, Dr. Walter B. Cannon, then a medical student, started his famous studies of the movements of the digestive tract. In December 1895 roentgen rays were discovered, and within a few months Cannon was at work. He took a goose, made it swallow some gruel containing bismuth and, with the roentgen rays, was able to see the material going down the esophagus. Later he was able to study the stomachs of mammals, particularly cats. He noted that when a cat was angry, with its tail lashing back and forth, its stomach usually showed no peristalsis. Cannon got along well with easy-going tabbies, but not with tomcats who resented being held when they wanted to leave.

I can still see, in my mind's eye, Cannon's old wooden box with a hole in the top where the cat lay. Cannon would sit with this box between his knees and hence got considerable burns on the skin of his wrists and legs. Once when he was telling me and some distinguished visitor from England about how he worked in 1896, he must have seen an odd look come into the man's eyes, because he said, "Oh, no; I have five children at home!" Fortunately, Cannon lived out a fairly long life, and as far as I know his heavy exposure to roentgen rays did not injure him or cause his death.

During the years between 1700 and 1850, little of significance happened in gastroenterology. I have in my library most of the books on digestive diseases published during this period, and they contain little of value today.

About 1750 a man named Jukes, an instrument maker in London, was making and selling stomach tubes. Since he was not a physician, his work was not much publicized and hence has been largely forgotten. Perhaps the first stomach tube used in America was employed by Dr. Philip Syng Physick. As I remember, about 1812, he saved the life of a girl who had taken an overdose of opium.

Stomach pumping did not become popular until around 1867, when the German Kussmaul was using this technic. He used often to help poor people who could not sleep because of an obstructed pylorus and some four or five quarts of fluid sloshing around inside of the stomach. In 1905, in my intern days, I used to pump these poor people out and give them great relief.

In 1871, von Leube began to use the stomach tube in attempts to diagnose ulcers and carcinomas of the stomach. Then along came Ewald and Boas, who did most to found the specialty of gastroenterology. As I remember, they started the first "gastro" clinic. Even yet, Ewald's book on digestive diseases, which was published around 1879, is worth reading. When, years ago, I first read it, I got many good ideas out of it.

In 1885, Ewald and Boas introduced the "test breakfast" now so well known. In 1886 Boas began to give lectures on gastroenterology. Boas also devised the so-called "test supper," in which the patient is given raisins or currants in the evening. In the morning, before breakfast, his stomach is pumped, and if the raisins are still there the stomach is not emptying very well.

In 1896 Nothnagel wrote a book, *Diseases of the Intestines*, that is still of some interest. About 1905 a few Germans wrote some excellent and beautifully illustrated books on fecal residues. For a while I thought such studies might throw much light on the digestion of individual patients, and so, during the years from 1910 to 1913, I studied 2,000 stools; but I decided I wasn't learning enough, so I abandoned the study and never wrote it up.

About 1888, Weil and others were studying jaundice and diseases of the liver. In 1876 Kuhne discovered trypsin, and in

1875 Losch observed parasitic amoebae in cases of dysentery. Note how far back some of these things go.

And then a great thing happened. About 1881, Billroth removed the lower end of a stomach for carcinoma and got away with it. The patient survived and lived for several months afterward. In 1882, Langenbuch and others were removing gallbladders. I understand that the first recorded cholecystectomy was performed by a surgeon in Indiana. In 1883, Connor of Cincinnati did a gastrectomy. About 1886, the American surgeon, Reginald Fitz, described appendicitis and started removing diseased appendixes.

I had my first training in gastroenterology in the years when internists were still unable to recognize the symptoms of peptic ulcers, gallstones, and early carcinomas of the digestive tract. Then came the first abdominal surgeons, who showed us what we had been missing. I remember seeing a prominent physician—one of the founding members of the Gastroenterologic Association who, for thirty months, had failed correctly to diagnose his own slow-growing carcinoma of the stomach. The symptoms had been typical from the start, but he was not a "surgically-minded" man.

About 1900, when the Mayos got going —operating on the abdomens of thousands of men and women—they did much to change the thinking of physicians all over. By performing thousands of "biopsies" they changed the face of medicine. In 1892 Kraske devised a difficult operation for the removal of carcinoma of the rectum. John B. Murphy of Chicago popularized intestinal resection. I can remember well the old "Murphy button," a silver apparatus with which the two ends of a cut bowel could be brought together.

Fifty-four years ago, in 1905, in a big city hospital, we interns already tended to do as interns do today: when a new patient with indigestion came in, the first thing we did was to pump out his stomach and measure the acid in his gastric juice. Fortunately I soon saw that gastric analyses seldom enabled me to make a diagnosis, so I stopped using this technic. Instead, I started trying to make diagnoses from a carefully taken history. That worked much better, and I have been studying the technic ever since.

In 1905 we had no roentgenologist in our huge hospital. All we had was a wheezy little roentgen ray machine with which, at times, we could examine a chest. That was as far as we could go. In those days my surgical chief used occasionally to operate on a patient with carcinoma of the stomach, but, as I remember, in most cases the tumor was too big to get out. Naturally, the immediate mortality was terrible.

My "hunch" at that time was that many of the patients died largely because they had been so severely purged the day before, with 10 grains of jalap and 10 grains of calomel, washed down perhaps with a big dose of magnesium sulfate. After a whole night spent on the toilet, the patient was worn out, weak and much dehydrated. For a long time I kept suspecting that these patients died largely because of the so-called preparation. And then one day I was sure of it! Why? I can still remember the nice man who taught me so much. He was a professional man of some kind—in his sixties—a man who was in the City Hospital only because he had lost everything he owned in the great San Francisco earthquake and fire. He had some lesion of the stomach, and my chief had said, "Send him in for operation." So he was given the usual devastating purgation. In the morning he looked so nearly dead I hated to send him up to the operating room.

Fortunately, that day the surgeon had listed more operations than he could per-

form, and my patient was sent back to the ward. What impressed me tremendously was that the poor fellow was so ill from the constant running-off of his bowels that he all but died. In those days we did not give the intravenous fluid my poor patient so badly needed.

I went to my chief and said, "Look; why are we 'preparing' these people? What is the reason for this violent purging? Can't you see that it commonly turns the tide against these people, and causes their death?" He said, "Well, we must clean the bowel out—don't you know that?" "Professor," said I, "now be honest with me. That can't be the reason, because you purge a woman just as violently when you are going to take her breast off. No; what is the *real* reason?" "Well, it's because the anesthetist wants it."

Fortunately my professor and I were on a friendly basis, so when I asked him to come with me and ask our leading anesthetist about this, he went. Going into one of the operating-rooms, I said to the ablest anesthetist on the Pacific Coast —dear old Dr. Palmer, a wonderful woman —"Doctor, do you want all these patients purged before they come to you?" "No," she said, "I surely don't want it."

About that time, I could see that my professor would have fired me; but we were short of interns, so all he did was to say he was sure there *must* be some good reason for a practice so hallowed by time.

From then on I spent all my spare time in the library trying to learn how it came about that patients had to be "prepared." Who had started it, and why?

Eventually I was satisfied that our idea of preparation had come down from the ancient witch doctor! It was he who had started it all in prehistoric times, with his idea of cleaning devils out of the body. The Greeks changed the idea a bit, and thought they should clean out "humors." Actually, we doctors were "preparing" a man for a great ordeal much as does an American Indian shaman when he prepares a lad in his tribe for the ordeal of entrance into the tribe as an adult. The lad has to be prepared *ritually*, and purgation may be part of the ceremony.

So I wrote a long article on the subject, and it was published in *Surgery, Gynecology and Obstetrics*. About that time I was able to show surgeons that the patient who, because of an abdominal emergency, had to be operated on without preparation always had a much easier convalescence than did the patient who was well "prepared." Fortunately, my arguments influenced most surgeons, and the strenuous preparation of patients was stopped.

Later I tried to get surgeons to stop purging on the fourth day after an operation, to get a bowel movement that couldn't be there. Why shouldn't it be there? Because the poor patient had had a big enema, and then no food for four days after the operation. How could he have any residue in his bowel? But on the fourth day, willy-nilly, a bowel movement was demanded of him. No one could give me any logical reason for the purge on the fourth day, but this time all my efforts went for naught. Eventually, I got some of the surgeons to give an enema instead. That was senseless enough, but at least it did no harm.

In 1910, I went into partnership with my old chief, and with him I began doing much gastroenterologic practice. For several years I did all of our roentgenographic work. I saw the coming of the intensifying screens that cut down on our exposures. The invention of the Bucky diaphragm and the Albers-Schonberg compression tube were also great helps in giving us clearer pictures.

In 1912 I became much interested in the gastrointestinal roentgen work of Rieder, Groedel and Holzknecht in Europe. They were writing beautifully illustrated

articles and telling of using the rays to see the stomach and bowels with the fluoroscope. They showed that they could diagnose ulcers, carcinomas and other lesions in the early stages. They had discovered something that most of us in America had been too stupid to note, namely, that if one wants to see anything with a fluoroscope, one must first stay in the dark for half an hour. One has to accustom one's eyes to a faint light. I was so interested in this German work that in 1912 I persuaded my partner to go to Germany and Austria and bring back one of the new pieces of apparatus. He went, and spent several months with Holzknecht.

At first when the new apparatus came, I was delighted with what I could see, but then I began to be unhappy because I was seeing so much that I couldn't understand. So for a while I gave up my clinical work and went East to Harvard to see if Walter B. Cannon could tell me what I wanted to know. On the train, I had read and studied his book *The Mechanical Factors of Digestion,* and so, on my arrival in Boston, I kept asking him question after question about the movements of the bowel. Why was this? Why was that? And to every question—every single one—like the fine and honest man he was, he answered, "I don't know." Finally he said: "Look; you seem to be so anxious to learn. There's my laboratory. I won't be able to work in it for a few months. Go and make yourself at home. I'll show you how to study the stomach and intestines in animals with the abdomen open under a bath of warm salt solution, and then you can go to work." This I did. Unfortunately, although for the next seventeen years I spent half of each day in a physiologic laboratory, I never got answers to many of my questions. But that is what usually happens in research.

One of the greatest things that ever happened for the improvement of gastroenterology was the invention by Dr. Coolidge of the modern high vacuum hot cathode tube. That made study of the digestive tract immensely easier than it had been before. I remember when Drs. Ruggles and Bryan had the best roentgen laboratory in San Francisco. When another roentgenologist came to settle in the city, everyone said, "He'll starve to death." But soon we saw that so many physicians were beginning to order roentgen studies of their patients that we would need many more roentgenologists in the city.

Then, in 1926, Graham and Cole showed us how to examine a gallbladder, roentgenographically, and that was another great step forward. Few people know that, in order to make that discovery, Dr. Graham, a thoracic surgeon, went back to school and studied chemistry. Graham told me, also, that at one stage in his studies on dogs he almost gave up in despair because the gallbladders were not showing up with the drug. Then one morning the caretaker of the animals failed to feed them, and as a result the gallbladders did not empty and hence showed up beautifully. Similarly, when Graham and Cole began to test their drug on men and women, again there was great disappointment because the gallbladder did not show up. Then it occurred to the doctors that they were testing the substance on persons with cholecystitis. When they tried the drug on a normal person they got a good picture of the gallbladder.

About 1914 we stopped using the old, big stomach tubes and used the little Rehfuss tube. These small tubes were easier on the patient. Then, the so-called fractional analysis and gastric analysis after the giving of histamine as a stimulus to secretion became fashionable. I personally thought most of this work a waste of time, because our skill in diagnosis was no better for these refinements.

The first journal of Gastroenterology

that didn't quickly fold up was founded in 1919 by Dr. Beaumont Cornell of Fort Wayne, Indiana. It was called the *American Journal of Digestive Diseases and Nutrition* and was edited by Dr. Frank Smithies until his health failed. Then I took over. Another journal on gastroenterology, called *Gastroenterology*, was started later. I was its editor until around 1950.

The American Gastroenterological Association was organized about 1907. I had quite a bit to do with reorganizing it about 1930. At that time, my fellow officers and I got in many associate members—surgeons, physiologists, biochemists and research workers—whose help we needed.

One of my distresses today is to find, in a university or clinic, that every man has been given a little field for research. One gets the gallbladder; another, the liver; another, the pancreas and another the colon; and the unforgivable sin is for the man working on the right half of the pancreas ever to do any research on duodenal ulcer. No one is allowed to trespass on his neighbors' preserves. I was always committing this crime, but never to steal anything from my friend, to learn from him.

For instance, when in 1913 I went back to see Dr. Cannon, my big question was: How is flatulence produced? Why isn't the gas quickly absorbed? I read everything I could find in the literature of gastroenterology, and found nothing. No gastroenterologist knew any more about flatulence than I did. Then it occurred to me that many cattle, sheep and horses suddenly become bloated and die. So I turned to the literature of the veterinarian phyiologists of Germany, and there was the information I was looking for on the ways in which the several gases form in the bowel and are normally eliminated from it. Hence, my advice to young researchers is, "whenever you get stuck and reach an impasse, go poaching on your neighbor's preserves. Perhaps you will learn a very helpful technic from him."

About 1919 the A M.A. met in St. Louis, and the biggest symposium was on the treatment of ulcer. The meeting was held in the biggest church in the city, which was filled to the doors. At that time most open-minded physicians were beginning to realize that none of the treatments for ulcer were entirely satisfactory, but the leaders in this field were still maintaining that all was well. At the big symposium they had as speakers two of the leading exponents of the medical treatment of ulcer and two of the leading exponents of surgical treatment. All four men said that they could cure ulcers without any difficulty. I was then asked to start the discussion. I remember how, as I went to that platform, my knees were shaking, and I was wondering what on earth I could say that would sum up the situation briefly; and then a story came into my mind.

I said to the audience that whenever any one of my medical friends, either an internist or a surgeon, started to tell me that all of his ulcer patients remained well after treatment, I was tempted to tell him the story of a day when St. Peter and St. Paul were sent down to earth by the Lord to look around and see how things were going on. When noon-time came they went into a restaurant and had a meal. Because they couldn't decide whose turn it was to pick up the tab, the waiter obligingly brought them the dice box. Peter took it and shook it very carefully; he mumbled a few words, and rolled out five sixes. He looked at Paul as much as to say, "All right, you can pay." But Paul also shook the dice very carefully; he mumbled a few words, and rolled out five sevens. And Peter said, "Now, Paul, no miracles between friends." With this, the doctors so howled with glee that they nearly shook the church down.

Later, at the next meeting of the "Gas-

tro" Association, when I confessed my inability to achieve any real cure of many of my patients with ulcer, some of the old-timers got up and said, "Perhaps Alvarez's cases don't stay well, but ours do." Two years later my good friend Dr. Burrill B. Crohn, of New York, came to the "Gastro" meeting and reported some statistics he had been gathering, which showed that the longer he had followed the patients he had treated for ulcer, the more of them he found coming back with a recurrent lesion.

By 1925 most of us who had open minds were seeing so many bad results from gastroenterostomy and so many jejunal ulcers that we had become much afraid of this operation. Most of the surgeons found it very hard to face this fact, but gradually, without giving any reason, they changed over to subtotal resection. In those days I was amused because, when in New York I would visit with my good friends—some of the leading surgeons in the city—and they would try to tease me by saying that they had just been operating on a dozen of my old ulcer patients who had come in with jejunal ulcers! I just teased them back, saying what was true, that I had recently seen a dozen of their "cured" patients with jejunal ulcers!"

Eventually some of my surgical friends became almost as afraid of operating on a young go-getter salesman "hot" with an ulcer as I was. Sometimes, when I had been unable to relieve the gastric pain of a man with a bad ulcer and I called in one of my surgical friends to take him over, he would hem and haw a bit, and say, "No, Walter, don't you think you'd better try medical treatment a while longer?"

Then along came our good friend Dr. Lester Dragstedt, with his new operation, vagotomy. It seemed logical, but unfortunately some patients were so distressed for months afterward with a stomach that failed to empty well that I became afraid of the procedure. Today most of the gastric surgeons I know seem to have abandoned it.

About 1910 we were supposed to put all patients with ulcers to bed in a hospital for a month, on the Lenhartz diet. Then Dr. Sippy came along and modified this diet, adding alkalis to it. I can remember in 1913, when I started my own practice in San Francisco, one of the first patients to come in was a nice little Jewish tailor with many worries and a bad ulcer. Following the then-accepted custom, I put him in a hospital on a strict diet, and immediately he was comfortable. At the end of the month, I assumed he was cured and sent him home. Later, when three months went by and he had not paid his bill, I went by his place and looked him up. He said, "Doctor, I'm terribly sorry I can't pay you. You see, when I came back here to the store, I found that the tailor I had left in charge of my business had decamped with my list of customers, my bolts of cloth and my wife. And with that, my ulcer pain came back worse than ever before." I felt so sorry for him I wished I had the money to pay his hospital bill, but in those days I was poor as a church mouse. All I could do was to decide never to put an ulcer patient in the hospital again for a month unless he had so much money that he would not be upset if, on going back to work, he found his ulcer bad again.

Another big question that for years has been distressing us gastroenterologists is still not well settled, and this is "Does a gastric ulcer ever or often turn into a carcinoma?" For years the Mayo group suspected that many gastric ulcers become malignant, but few physicians agreed. What we at Mayo's were sure of was that many ulcer-like lesions in the stomach were really malignant when first seen. We were sure, also, that in many cases a person who had what looked like a benign gastric ulcer later returned with a gastric

carcinoma. Where it had started—that we could not say. We also learned that the person with an achlorhydric stomach is particularly likely to show up some day with a gastric carcinoma.

Years ago, when I visited Dr. Harold Wolff in New York, he taught me more about the origin of peptic ulcers than I had ever learned before. He showed me color photographs of the gastric mucosa of his laboratory assistant, Tom. Tom had a feeding gastric fistula with some bulging outward of the gastric mucosa. When he was happy and at peace, this mucosa was flat and pinkish, with but little gastric juice on it. When Tom is angry or worried or aggravated, the mucosa swells and becomes dark red, and much secretion comes from it. Then it can easily become ulcerated.

For forty-nine years I have been studying the stories of patients with ulcers, and the more I see of these people the less I am interested in giving them a diet. I care little what the patient eats. There's one thing I want to know, and this is: What is life doing to him—how is it distressing him? I show the man Wolff's pictures of Tom's gastric mucosa, and I say, "All I ask of you is that you live so that your gastric lining is flat and pink and dry—then I doubt if you will need any help from me. But if you get your insides into such an uproar that your gastric lining gets swollen and purplish, then you're likely to have trouble."

One patient I saw with an acute ulcer, just before last Christmas, got into trouble when a big shipment of goods coming from Europe was lost in transit. If it did not arrive pretty soon, he would be in serious financial difficulties. In January, a few days after taking inventory, he wrote me from Florida, "My ulcer is gone."

How wonderful it would be if I could look into the future and describe the great advances in gastroenterology which are to come in the next fifty years. This being impossible, I shall express once more my gratitude for the tremendous improvements that have taken place in medicine in the past sixty years.

Most surgeons have abandoned the Fowler position in the nursing of abdominal injuries. Formerly looked on as the key to postoperative treatment, it is now regarded by many as the source of all evil and the originator of most of the distressing or fatal complications that may follow abdominal section. It was supposed to give comfort and rest: it does neither. It was thought to encourage infected fluids to drain downwards; by increasing the negative pressure in the infra-diaphragmatic spaces it actually encourages the formation of a subphrenic abscess. It was said to lessen postoperative chest complications: on the contrary by enforcing immobility of the legs and lower thoracic cage it favours phlebothrombosis and pulmonary collapse in which most of them arise.

—*Ogilvie*

A Call for Volunteers

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for the

Journal of the International College of Surgeons

Our Abstract Editor, Dr. Stephen A. Zieman of Mobile, Alabama, is in need of recruits to aid in maintaining the Journal's fine abstract service at its present high level. The presentation of concise, well-written abstracts of articles appearing in the current literature is an important feature of every professional publication of the first rank, and especially, it goes without saying, of a Journal of world-wide circulation. Time and experience have more than proved its value.

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The journals for abstracting, of course, will be supplied, and the manner of presentation can be seen by glancing over the section headed "Abstracts from Current Literature" in any issue of the Journal of the International College of Surgeons. Those who would like to volunteer for this signal service are requested to send their names and addresses to

Dr. Stephen A. Zieman, *Abstract Editor*
Journal of the International College of Surgeons
805 Government Street
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New Books

BOOKS RECEIVED

The following books have been received by the Editor; they will be reviewed critically as space and facilities permit. Omission of more extended review, however is not to be taken as criticism of the merit of the book.

Surgical Philosophy in Mass Casualty Management. By Warner F. Bowers and Carl W. Hughes. Springfield, Ill.: Charles C Thomas, Publisher, 1960. Pp. 204. *Reviewed in this issue.*

Cardiac Resuscitation. Edited by J. Willis Hurst. Springfield, Ill.: Charles C Thomas, Publisher, 1960. Pp. 120. *Reviewed in this issue.*

The Physiology and Treatment of Peptic Ulcer. Edited by J. Garrott Allen. Chicago: The University of Chicago Press, 1959. Pp. 236, with 72 illustrations. *Reviewed in this issue.*

Medical Management of the Menopause. By Minnie B. Goldberg, M.D. New York: Grune and Stratton, 1959. Pp. 98. *Reviewed in this issue.*

The Foot and Ankle. By Philip Lewin. Philadelphia: Lea and Febiger, 1959. Pp. 612, with 339 illustrations. *Reviewed in this issue.*

Functional Bracing of the Upper Extremities. By Miles H. Anderson. Springfield, Ill.: Charles C Thomas, Publisher, 1958. Pp. 463. Illustrated.

Le risque operatoire en chirurgie biliopancreatique (The Operative Risk in Biliary Surgery). By Yves Salembier. Paris: Masson et Cie, 1959. Pp. 260, with 2 illustrations.

Experimental Surgery, Including Surgical Physiology. By J. Markowitz, J. Archibald and H. G. Downie. Baltimore: The Williams and Wilkins Company, 1959. 4th ed. Pp. 931, with 580 illustrations. *Reviewed in this issue.*

Le Diagnostic du Cancer d'Estomac a la Periode Utile (Diagnosis of Carcinoma of the Stomach at the Time Most Favorable for Treatment). By Rene A. Gutmann. Paris: G. Doin et Cie, 1956. Pp. 257.

Operative Surgery. Edited by Charles Rob and Rodney Smith. London: Butterworth & Co., Ltd.; Philadelphia, F. A. Davis Co., 1956. Vols. 1 and 2 of 8 (plus index). Profusely illustrated.

The Clinical Management of Varicose Veins. By David Woolfolk Barrow. New York: Paul B. Hoeber, 1957. Pp. 167, with 70 illustrations.

Pathology and Surgery of the Veins of the Lower Limbs. By Harold Dodd and Frank Cockett. Baltimore: The Williams & Wilkins Company, 1957. Pp. 462, illustrated.

Spinal Cord Compression. By I. M. Tarlov. Springfield, Ill.: Charles C Thomas, Publisher, 1957. Pp. 147, with 41 illustrations.

The Surgeon's Tale: The Story of Modern Surgery. By Robert G. Richardson. New York: Charles Scribner's Sons, 1959. Pp. 227, with 45 illustrations.

History of American Medicine. Edited by Felix Marti-Ibanez. New York: MD Publications (MD International Symposia), 1959. Pp. 181.

The Surgical Treatment of Facial Injuries. By Varaztad Hovhannes Kazanjian and John Marquis Converse. Baltimore: The Williams and Wilkins Company, 1959.

A Psychometric Study of Identical Twins: Discordant Results for Closed Head Injury. By S. Dencker and B. Lofring. Copenhagen: Ejnar Munksgaard, 1958. Pp. 50, with 12 illustrations.

This monograph, translated from the Swedish by Helen Frey, is a psychometric investigation of 31 unselected cases of closed head injury, with identical twins used as controls. An average of ten years had elapsed between injury and examination; the shortest interval was three years. Only twins between 10 and 60 years of age were examined. The following battery of tests was used: (a) tests of intelligence and concentration; (b) new learning; (c) reaction time; (d) ability to shift; (e) ability for abstraction, and (f) visual perception, with special reference to figure-ground discrimination and fatigue thresholds. The tests and results are described in detail.

The intra-pair difference showed the injured persons to be significantly inferior to their partners in (a) the ability for abstraction, as measured by the Sorting test, (b) figure-ground discrimination (tachistoscope test), (c) ability to shift as measured by the mirror drawing test and (d) speed, distribution of attention and manual coordination ability as measured by the distributor test. None of the tests of other functions revealed significant differences, but in almost all of them the twin with the head injury had worse scores than the control. It was also noted that the results for subjects with severe head injuries were inferior to those of their partners in a significant proportion of the tests; this was not true of mildly injured persons.

The authors conclude that correlative analysis of psychological test results may be able to throw light on the cognitive changes following injury of the brain.

HAROLD C. VORIS, M.D.

Hope Deferred. By Jeanette Seletz. New York: The Vantage Press, 1960. Pp. 546.

This novel was first presented to the public in 1943 and is now being reissued. In the main it could have been written yesterday. Minor discrepancies such as interns selling or trading services, do not date the era. Although the drama and conflict revolve about the pioneering of neurosurgery, the same problems are met as each new field of medicine is opened. The basic problems of a medical student remain the same—that of training the mind and body to respond to the needs of the patient regardless of his own emotional or physical needs.

The author has dedicated the book to a sister and brother, Drs. Rachelle and Emil Seletz. One must presume that it is from their experiences that she has gained such familiarity with the development of a qualified physician. The story relates the evolution of gangling youths into responsible members of the medical profession. Not every class will contain a man of the ideals, integrity and dedication that are embodied in Jone Brent and Buckley Brown, but there have been enough such men to make these characters believable. In this story the layman can find insight into the life of the glamorous young "men in white" who fill our hospital corridors. The physician will find it entertaining and perhaps nostalgic. The book can be recommended.

LEOTA BAILEY, R.N.

Experimental Surgery, Including Surgical Physiology. By J. Markowitz, J. Archibald and H. G. Downie. Baltimore: The Williams and Wilkins Company, 1959. 4th ed. Pp. 931, with 580 illustrations.

Surgeons who are familiar with the first three editions (1937, 1949 and 1954) of this fine text on a vitally important subject will be delighted with the latest revision, which includes new material on the prostate gland, hypothermia and elementary experimental surgical research on the central nervous system. The most recent changes in vascular surgical technic and in tissue transplantation are noted.

The surgeon or student who reads the book for the first time will find it rich in basic knowledge invaluable to the surgeon.

The authors use a team approach to their subject. Dr. Markowitz is Professor of Physiology at the University of Toronto; Dr. Archibald, Professor and Head of the Division of Small Animal Medicine and Surgery at Ontario Veterinary College, and Dr. Downie, Professor and Head of the Department of Physiological Sciences at the same school. All the basic science in the world, say these men, valuable although it is in the general picture, will not teach a man to operate; but "the student who has mastered the difficult phases of experimental surgery on animals may better profit by his experience in the operating room." The case is even more forcibly stated: "Only a small part of the art of surgery can be taught in the lecture room . . . Occasionally a procedure used in clinical surgery, such as blood vessel anastomosis, can be mastered only in the experimental laboratory."

The study is concerned with operative technics suitable for animals, mostly dogs. Much of the technic presented has been used at the Institute of Experimental Medicine of the Mayo Foundation; at Johns Hopkins Hospital, and by other groups in Chicago. All phases and aspects of animal surgery are investigated, and in each case correlated with similar procedures on the human body. The book therefore has the double value of practical guidance in experimental surgery and of presenting experimental surgery "whole," in its important rôle in the advancement of surgical technics. The illustrations are beautifully done, and the index thorough.

For reading pleasure, the book is rare indeed. The authors are not only surgeons and authorities on their subject, but polished writers as well. Every surgeon and aspiring surgeon should read it.

M. T.

Medical Management of the Menopause. By Minnie B. Goldberg, M.D. New York: Grune and Stratton, 1959. Pp. 98.

The author wrote this small book because her clinical practice, bridging both the pre-hormonal and the hormonal era, has convinced her of the great boon of hormonal therapy for disturbances of the menopause. She successfully disproves the baseless and unproved fear of some physicians that the estrogens are responsible for carcinoma in women.

The book contains a great deal of useful information about the treatment of the change of life. There are lists of the common commercial preparations of estrogens, androgens, combined estrogen-androgen preparations and progestins with their trade names, the firms which manufacture them, the generic name, the effective doses, and their advantages and disadvantages. This is definitely a worth-while book.

J. P. GREENHILL, M.D.

Cardiac Resuscitation. Edited by J. Willis Hurst. Springfield, Ill.: Charles C Thomas, Publisher, 1960. Pp. 120.

This is a concise positive monograph written by recognized authorities in the field. In addition to the description of the immediate technic of open chest resuscitation, new evaluations in the use of external defibrillation are presented, with a description of the pacemaker in the Stokes-Adams syndrome. Legal and theological implications are presented in two chapters. Their value is self-attested to any thinking medical man who has had to or has tried to resuscitate a heart. This book is recommended to all doctors, but especially to those who perform occasional operations.

HERBERT D. TRACE, M.D.

The Foot and Ankle. By Philip Lewin. Philadelphia: Lea and Febiger, 1959. Pp. 612, with 339 illustrations.

It is always a great pleasure to meet up with an old favorite; this comprehensive text has been an extremely helpful reference for years. Anything that can happen to the foot and ankle is described somewhere in these pages. The author, one of our outstanding orthopedic surgeons, has given freely of his vast experience.

In this, the fourth edition, we have not merely a face-lifting job but a thorough revision of the text. Many new illustrations and much new material have been added. Recently accepted surgical procedures related to cerebral palsy, hallux valgus and subtalar arthrodesis are good examples. Compound fractures and crushing injuries have been given additional emphasis, particularly from the standpoint of more conservatism in therapy. The appendix, which contains a wealth of clinical material, has been completely rewritten.

To those of us who have relied on this book in the past, this new edition is most welcome. To those who have not yet availed themselves of this opportunity, it is not too late.

ALLAN B. HIRSCHTICK, M.D.

The Physiology and Treatment of Peptic Ulcer. Edited by J. Garrott Allen. Chicago: The University of Chicago Press, 1959. Pp. 236, with 72 illustrations.

This monograph, dedicated to Dr. Lester R. Dragstedt, is presented in recognition of his monumental contributions to the field of gastrointestinal physiology and surgery. Each contributor is either a former student or a clinical associate. Over the years each has shared with him some of the points of view that have emerged from their common interests. The first four chapters concern the physiologic aspects of gastric secretion and describe selected experiments which have led to a new concept of the pathogenesis of peptic ulcer and a satisfactory explanation of the differences between gastric and duodenal ulcers, especially in their response to surgical treatment. Chapter 5 deals with roentgen diagnosis and treatment of peptic ulcers; Chapter 6 details the current status of the medical management of duodenal ulcers. Chapter 7 describes the surgical procedures for duodenal ulcers and the indication for each; Chapter 8 presents the clinical importance of the cephalic secretory phase, with special reference to vagotomy and gastrojejunostomy. Chapter 9 is concerned with peptic activity in the physiologic and pathologic pictures, the clinical course and the therapy of gastric ulcer. Chapter 10 presents material on the small gastric ulcer, benign or malignant. The final chapter is concerned with the influence of physiologic observations on the treatment of peptic ulcer and closes with a most revealing statement by Dr. Dragstedt, entitled "What Would I Do If I Had An Ulcer?"

The book is a factual presentation of the subject in all of its phases and gives an authoritative account of the position vagotomy and the drainage operation hold in the surgical management of this condition. It is highly recommended to all who are responsible for the care of patients with peptic ulcer.

MANUEL E. LICHTENSTEIN, M.D.

Nouvelle Pratique Chirurgicale Illustrée. (New Surgical Techniques Illustrated). Edited by Jean Quénu. Paris: G. Doin & Cie, 1958. Pp. 296, with 260 illustrations by Rivallain.

This is the eleventh volume in a series on surgical technics compiled by Prof. Quénu. Seven French surgeons have collaborated. There is an index of the contents of the previous ten volumes in anatomic and alphabetic order.

The first chapter, by Georges Thomeret, deals with the case history of a 23-year-old woman with localized Hodgkins disease. The affected nodes (at the base of the left side of the neck) were removed *en masse*. The surgical technic is described in detail. Thorough examination revealed no evidence of adenopathy elsewhere in the body. The author realizes that Hodgkin's disease is usually systemic but considers the localized condition in this case, diagnosed so early, was justifiably subjected to immediate operation.

The second chapter, by Claude Dubost, pertains to lobectomy of the inferior lobe of the right lung for dilation of the bronchi. The patient, a 32-year-old man, had had chronic purulent expectoration, hemoptysis and attacks of fever since infancy. The diag-

nosis was established bronchographically, with lipiodol as the contrast medium. The author stresses the importance of preoperative preparation, postural drainage and voluntary expectoration in order to prevent inundation of the operative field with sputum, which might instigate postoperative infection and atelectasis. Every step of lobectomy is explained in 42 excellent illustrations, including the technical maneuvers necessary to isolate and ligate the pulmonary artery and vein and the terminal bronchus.

The third chapter, by Jean Perrotin, deals with total gastrectomy followed by esophagojejunogastrostomy. The author formerly employed this operation frequently but now reserves it for selected cases. The troublesome sequelae of agastria led him to limit the operation to cases of advanced disease. The massive gastric carcinoma is excised, the incision being extended well into healthy tissue, and includes ablation of the spleen, the tail of the pancreas and the gastrosplenic and pancreaticosplenic ligaments. Perrotin obtained 2 five-year cures among 10 patients. The eleven steps of the operation are depicted in 65 clearcut illustrations.

The fourth chapter, by P. L. Chigot, is devoted to a modified Mathieu technic for the surgical correction of hypospadias. The author has had much experience, operating on 40 patients a year. The technic described is for the common penoglandular type. The less common penoscrotal type requires a different approach. Routine preliminary perineal urethrostomy has assured success in the one-stage operation. This intervention is based on the autoplastic operation of Mathieu, in which a flap of skin is utilized to form a new urethra for the terminal portion of the penis. In addition to preliminary urethrostomy, the author modifies Mathieu's technic by supporting the skin sutures over the newly formed urethra with through-and-through silkworm gut sutures to which pieces of lead are attached.

The fifth chapter, by Michel Chartier, pertains to a complex vaginal operation for total prolapse. The 57-year-old patient presented a totally exteriorized postmenopausal atrophic uterus (diagnosed hysterographically). The bladder was contained in a large irreducible cystocele (no rectocele was present), and the cul de sac of Douglas extended down to the cervix. The various steps in reconstructive repair consisted of partial colpectomy, reduction of the bladder, vaginal hysterectomy with conservation of the adnexae, ablation of Douglas' pouch, suspension of the uterosacral ligaments (Campbell's technic) and posterior colpoperineorrhaphy. The author makes a point of stressing the importance of this procedure, which assured a normal sex life for the patient. Preoperative and postoperative care are described in detail, and 41 illustrations are accompanied by explanatory footnotes.

Chapter 6, by Paule Pillot, deals with the treatment of recent fractures of the radius and ulna by fixation of an onlay graft by means of screws. The author points out that greenstick fractures in children are amenable to orthopedic reduction. Similar treatment in adults is followed by poor results, because of the difficulty in carrying out perfect adaptation (so indispensable to the precise and complex mechanism of movement) as well as the danger of pseudarthrosis. Thirty-two illustrations depict the surgical technic that has improved the prognosis for this type of fracture.

Chapter 7, by Jean Validire, deals with another orthopedic problem—pseudarthrosis of the femoral diaphysis and bending of the Kuntscher nail originally employed in intermedullary nailing of this bone. Extraction of the bent nail, removal of extraneous tissue from ends of the fractured femur forming the pseudarthrosis, insertion of a larger nail and apposition of the tibia by means of an onlay graft are explained in 29 illustrations.

This eleventh volume on surgical technic measures up well to the preceding ten volumes compiled by Prof. Quénu. It contains material of great interest to the student as well as to the surgeon interested in plastic, thoracic, gynecologic, urologic and orthopedic surgery. The complex operations are clarified by beautiful illustrations. The reader will find the book most instructive.

CHARLES PIERRE MATHÉ, M.D.

Nouvelle Pratique Chirurgicale Illustrée; Fascicule XII (New Surgical Techniques Illustrated; Volume 12). Directed by Jean Quénu. Pp. 296, with 254 illustrations by P. Rivallain. Paris: G. Doin et Cie, 1958.

This is the twelfth in a series of volumes on surgical technic compiled by seven French surgeons under the direction of Professor Quénu. It contains a summary of the contents of the previous eleven volumes as well as an index in anatomic and alphabetic order.

The first chapter, on lobectomy of the middle lobe of the lung, by Claude Dubost, deals with the case history of a 25-year-old man with caseous tuberculosis that did not respond to intensive medical treatment. The author points out that, although removal of the middle lobe of the lung is anatomically simple, success depends upon careful dissection of the bronchus and the blood vessels making up the pedicle. The operation can be hazardous, however, in the presence of complicating calcified tuberculous involvement of the lymph glands associated with the pedicle. Each step—freeing, clamping, ligation and suture of the vessels—is described in detail and illustrated. The technic for repair of a torn vessel is also presented.

Chapter 2, also by Dubost, is devoted to portacaval anastomosis for portal hypertension secondary to cirrhosis of the liver or to mechanical obstruction of the portal or the splenic veins. These lesions cause dilation of the anatomic portacaval anastomosis and the formation of varices at the level of the esophagus and the heart, which may be the source of grave hemorrhage. The author describes a patient 45 years of age who had repeated digestive hemorrhages, an enlarged spleen and large varices of the esophagus secondary to cirrhosis of the liver. A previous splenectomy prevented utilizing the splenic vessels, and the author carried out a laterotermínal anastomosis of the portal vein to the vena cava. This extensive operation is illustrated in great detail. Damage to the liver cells with resulting acute hepatic insufficiency and coma, rather common following portacaval anastomosis, did not occur, and the patient made an uneventful recovery. The esophageal varices disappeared, but the patient is still being treated for hepatitis.

The third chapter, by Louis Quénu, is concerned with removal of a huge (21 Kg.) retroperitoneal pararenal lipoma by the transperitoneal route. The growth completely surrounded the right kidney, from which it was separated by sacrificing the capsule. It also extended well into the bony pelvis. The operation is illustrated, showing the extensive incision of the abdominal wall, separation of the tumor from abdominal organs, incision and suture of the posterior peritoneum, etc. The author points out the hazard of sudden cardiac decompensation due to decompression, which may follow this extensive procedure. Renal damage may manifest itself later, owing to trauma or sclerosis of perirenal tissues. Recurrence of tumor, histologically different from the original growth, may take place. While these lipomas may vary histologically, they are usually benign; occasionally, however, they are mildly malignant.

Chapter 4, by Robert Kaufmann, describes the removal of tuberculous lymph glands and vessels as a method of preventing tuberculous osteoarthritis. Kaufmann points out that the lymphatics of the lower half of the body (below the diaphragm) are satellites of the femoral and iliac veins and the inferior vena cava, and are infected by tuberculosis long before the bony structure of the body is involved. Removal of the infected ileocrural lymph nodes is accomplished by making separate incisions. Those situated over the iliac vessels, aorta and vena cava are removed retroperitoneally, through an extended incision over the inguinal canal. The superficial and deep nodes of the crural canal are removed through a separate incision along the inner aspect of the upper portion of the thigh. Paraspinal cold abscesses situated below the pleura are removed through a retroperitoneal curvilinear lumbar incision. Details are minutely described and illustrated.

The fifth chapter, by Michel Chartier, considers the treatment of uterovaginal prolapse by the modified Manchester technic

(English school). The author points out that the most frequent cause of postoperative recurrence of prolapse is elongation of the cervix, with or without hypertrophy. The ten operative steps that assure success are well depicted.

Chapter 6, by Jean Gouzon, deals with pollicization (replacement of the thumb by the ring finger) utilizing the technic of Letac. The author presents the case history of a North African laborer whose hand was crushed in a press, with destruction of the thumb, the greater portion of the first metacarpus, the thenar muscles and the vascular pedicle of the index finger. Incomplete flexion of the fingers and the small amount of metacarpus remaining made it impossible to carry out a corrective operation by graft. It was important to retain the index finger in place; therefore, the ring finger was selected for forming a new thumb. The Letac technic, in which the finger, including its vascular and nerve pedicle and tendons, but without the metacarpus, was transposed by tunneling the palm, is described and illustrated. One year after the operation the functional result was satisfactory, the hand free of pain and prehension good between the thumb and index finger.

Chapter 7, by J. P. Dejouany, presents the operative cure of hallux valgus by resection of the phalangeal base. The operative correction of this deformity (most common in women over 40) includes resection of the exostosis of the metatarsal bone and the base of the phalanx, insertion of a capsular flap in the space separating the two bones, etc. Morphologic and functional results are good—and recurrence is due only to continued wearing of pointed-toed shoes!

This twelfth volume maintains the same high standards that characterized the earlier volumes compiled by Prof. Quénu. It deals with surgical procedures of great significance to all interested in abdominal, gynecologic, orthopedic, plastic, thoracic and prophylactic tuberculosis operations. The technical maneuvers of these complex procedures are minutely described and clarified by the outstandingly fine illustrations of Rivallain.

CHARLES PIERRE MATHÉ, M.D.

A Técnica das Ressecções Pulmonares (Technic of Pulmonary Resection). By Edidio Guertzenstein. Rio de Janeiro, Brazil: Livaria Atheneu S.A., 1959. Pp. 324, with 220 illustrations.

The author's idea in publishing this book is to present a practical and easy technic for pulmonary resection. Physiologic and anatomopathologic factors are not touched on, since each is in itself a large and special study, and because it is obvious that the surgeon who enters this specialty must already have acquired a background of knowledge. Since pulmonary surgery is the basis of thoracic surgery, the book will be practical to those who wish to perform cardiovascular operations.

There are many photographic illustrations, as well as sketches that present anatomic details. There are no drawings of malformations, but these are fully described in the text.

The book is an atlas of anatomy and presents a simple and efficient technic for pulmonary resections.

JUAN OLIVELLA, M.D.

Therapeutic Nutrition with Tube Feeding. By Morton D. Pareira. Springfield, Ill.: Charles C Thomas, Publisher, 1959. Pp. 55, with 17 illustrations.

This well-prepared book is divided into chapters indicating the basis, history, method and indications for tube feeding. Primarily it deals with the indications for, the proper application of and the response to tube feeding in the malnourished patient, regardless of the cause of the malnutrition.

The author has compiled statistics in a compact manner concerning the types of food recommended, the type of tubing employed and the results. He has prepared his work well.

This book is to be highly recommended to all surgeons especially in the gastrointestinal, facial-maxillary or pharyngeal fields. I strongly suggest that all men in the practice of medicine, regardless of specialty, read it and become familiar with the latest methods of tube feeding.

DAVID B. VARON, M.D.

Textbook of Otolaryngology. By David D. DeWeese and William H. Saunders. St. Louis: The C. V. Mosby Company, 1960. Pp. 465, with 354 illustrations.

With emphasis on diagnosis and treatment, the authors have attempted to bring to the student and the generalist modern concepts of otolaryngology. Realizing that this is a herculean task to cover in 465 pages, they have added selected readings at the conclusion of each of the 32 chapters. They have included some 354 figures consisting mainly of photographs of diseased states and drawings by one of the authors (W.H.S.). As would be expected, so large a field is sometimes too briefly considered in some areas, while others have been given detailed coverage quite beyond the comprehension and requirements of the intended readers. This applies particularly to the discussion of operative technics, which may be more suitable as a reference for the specialist. The book has a good format; it is well written, practical and informative.

FRANCIS L. LEDERER, M.D.

Surgical Philosophy in Mass Casualty Management. By Warner F. Bowers and Carl W. Hughes. Springfield, Ill.: Charles C Thomas, Publisher, 1960. Pp. 204.

The authors of this book are the Chief and Assistant Chief of the Department of Surgery at Tripler U. S. Army Hospital in Honolulu. Since 1954 they have studied and discussed the management of mass casualties, and this book is the outgrowth of their experience. They recognize an apathy on the part of many physicians and most civilians to the problems of atomic disasters, but insist that it is a serious error to assume that nothing be attempted because nothing can be accomplished. The principles of military surgery will govern in a large disaster, and the attempt must be made to "do the most good for the greatest number at the right time and in the proper place." Meager facilities will necessitate the use of all resources where they will be most effective. The purpose of this book is to point out that "the situation will indeed be grim but that proper assessment, prior planning, utilization of a pre-formed organization, short cuts and modifications in accepted treatment, will allow a faint ray of hope in place of the gloom of total defeat."

"Most civilian doctors are almost totally unprepared for mass casualties, but even if they are prepared an organization to get the patients to them is a first essential." This includes traffic control communications, police protection, fire control, supplies, etc. To effect this, the authors urge that "every individual in the community should become proficient in at least one of these fields."

The major portion of the book deals with the professional handling of various casualties and urges the use of veterinarians, dentists, pharmacists, and laboratory technicians in duties that will free the surgeons of many details. The contents of the chapter on hospital planning have been emphasized widely. The principles of sorting of patients for treatment are of the utmost importance and are poorly recognized by doctors who have not had military combat experience. It is a job for the most experienced surgeon, whose decisions are based on available time, personnel and supplies. Four casualty groups are outlined for treatment purposes: (1) the minimal treatment group, or walking wounded; (2) the immediate treatment group, in which bleeding must be stopped and the air way cleared if the patient is to survive; (3) the delayed treatment group, who require resuscitative measures or can wait for a few hours, and (4) the expectant treatment group, to include those who cannot be expected to live or for whom treatment is simply not available. The criteria for cataloguing patients by groups are outlined. The lessons of civilian disasters are discussed. The last several chapters deal more specifically with various injuries, including burns, fractures and the effects of irradiation.

Probably few physicians will read the book, but this reviewer would urge that it be studied by the chief surgeon of every hospital. It is his responsibility to prepare his staff for "the largest disaster that can be handled and then do our best with whatever situation arises."

CHESTER C. GUY, M.D.

Abstracts from Current Literature

Results of First Experimental Application of Cobalt 60 to the Frontal Lobe of the Rabbit.* Jentzer, A., Confinia Nerologica 19: 264, 1959 (Paper presented at Société de Neuro-Chirurgie de Langue française, Paris, Dec. 2, 1958. Translated for the Journal of the International College of Surgeons by Charles P. Mathé.)

"In a previous article (*Glioblastomas Treated with Cobalt,* Neuro-Chirurgie T.I. 2:153, 1955) I observed that in spite of high doses of cobalt 60 implanted intracerebrally in man the pyramidal cells were unchanged at the site of application. Because of these results, I decided to ascertain what effect the delayed action of various doses of cobalt 60 would have on the brain. For this experiment rabbits were selected. Implantation of cobalt 60 was intracerebral or extradural.

"Implantations were made on 15 rabbits (7 intracerebral, 8 extradural) at intervals between July 15 and Oct. 3, 1953. In the first series, 1 rabbit was given 6,000 r; another, 9,000 r; another, 12,000 r; 2 others, 15,000 r and 2 others 18,000 r. In the second series 2 rabbits were given 3,000 r; 1, 6,000 r; 1, 9,000 r; 2, 12,000 r; 1, 15,000 r, and 1, 18,000 r.

"Microphotographs were taken of all microscopic sections, which revealed, at various intervals, the different stages of histopathologic evolution of the brain at the site of application of cobalt 60. I particularly wish to thank Prof. E. Rutishauser, Director of the Pathologic Institute, Geneva, and Dr. E. Wildi, neuropathologist, Faculty of Medicine, Geneva, for their invaluable assistance. They examined all microscopic slides and according to findings in each case made the anatomicopathological diagnosis. Chronologic observations of the findings could be established because the animals succumbed at different intervals, from sixteen days to twenty-two and one-half months after application of cobalt 60. A single rabbit was killed two and one-half years after irradiation. Each rabbit was given only one application of cobalt 60, the dose varying from 3,000 to 18,000 r for a period within four to twenty-four hours (in twenty-four hours, 18,000 r destroys within a distance of 0.5 cm. from the point of insertion of the needle; needle length, 10 mm.; equivalent to 19 mg. RaEl; no filtration). Microphotographs of the brains of 2 rabbits showed the beginning of malignant transformation in one and typical malignant transformation in the other.

"*General Conclusions.*—In this first experiment with intracerebral and extradural implantation of cobalt 60 in rabbits, the following points were observed:

"1. As the animals died spontaneously at different times, it was possible to determine, by microphotographs, the early stages of pathologic mechanism in the formation of malignant glioma in the rabbit.

"2. The dosage of cobalt 60 seemed to play a rôle in the development of cerebral tumor. No malignant tumor developed in the brain of the rabbit given only 3,000 r, and this animal was killed two and one-half years after the implantation.

"3. The rabbits that lived from sixteen days to eight months showed the beginning of pathologic signs in cerebral tissue at the site of application of cobalt 60, but in these cases it was too early to consider tumor.

"4. On the other hand, in a rabbit which was given 12,000 r a tumor developed within thirteen months, with the characteristic picture of an actively growing malignant glioma; in another rabbit, which had been given 18,000 r, a true malignant glioma developed within twenty-two and one-half months (it survived nine and one-half months longer than did the rabbit just described).

"It is known that cerebral tumors can be

*This presentation is not, strictly speaking, an abstract; it is the whole of Prof. Jentzer's communication. Because of its brevity, Dr. Charles P. Mathé, who kindly translated it for the *Journal,* has given us permission to reproduce it here.

experimentally produced by the use of chemical substances (methylcholantrene, benzopyrine, etc.); but in my opinion this is the first time they have been produced by radioactive isotopes.

"*Summary.*—The results of the author's first experimental application of cobalt 60 to the frontal lobe of the rabbit are described. Microscopic sections showed the different stages in histopathologic development of the changes in the brain at the site of application. The most important microscopic slides are illustrated by 5 microphotographs. It is here shown for the first time that one can produce a malignant cerebral glioma by radioactive isotopes."

CHARLES PIERRE MATHÉ, M.D.,
Translator

Transfusion of Cadaver Blood. Petrov, B. A., Surgery **46**:651, 1959.

In March, 1930, S. S. Yudin of the Sklifosovsky Institute in Moscow, Russia, performed a transfusion of cadaver blood to man. Prior to this time a great deal of study had gone into the possibility of this procedure and had revealed cadaver blood preserves its sterility for several hours after death and remains functionally active so far as oxygen-carrying capacity is concerned. The sterility and oxygen-carrying capacity are available up to six hours after death. During these preliminary studies it was also noted that the blood did not coagulate or, if it did coagulate, it lysed and became liquid and so remained. Thus the blood can be preserved without the addition of anticoagulants, and this factor aids in the prevention of complications and reactions occasionally observed when citrated blood is employed.

A specific unit, staffed by a well-trained team, is on duty at all times to obtain the cadaver blood, which is obtained from persons dying suddenly of heart failure, hypertension, cerebral vascular accident, alcoholism, electric shock and the like. In general, blood from patients killed in accidents is not used; certain closed head injuries, however, may be acceptable. The technic of withdrawing the cadaver blood is described, and it is stated that the average adult cadaver yields up to 3 liters of undiluted blood. As an additional portion of the technic, the cadaver's cardiovascular system is washed with a dextrose phosphatic solution to obtain approximately 2 liters of washed blood, which possesses erythrocytes and hemoglobin at approximately 50 to 60 per cent of normal levels.

After procurement of the blood, laboratory tests and cultures are done to determine the safety of the blood for administration to the living patient. In addition, the cadaver is subjected to a thorough autopsy and microscopic tissue examination. When all results have proved favorable the blood is released for clinical use. At this time more than 27,000 transfusions have been performed.

The author points out that elaborate study of the donor at autopsy, with careful testing and culturing of the blood, guarantees a degree of safety to the recipient that is not otherwise obtainable. It would appear that the use of cadaver blood by the technics described in this article is reasonable and should find wider application.

CHURCH E. MURDOCK JR., M.D.

Postgastrectomy Steatorrhea. Wirts, C. W., Goldstein, F., and Wise, R. I., A. J. of Gastroenterol. **31**:250, 1959.

Two of the most troublesome sequelae of gastrectomy are the "dumping syndrome" and the "malabsorption syndrome." The authors carefully differentiate between these two and explain the basic physiologic factors involved.

In the dumping syndrome the symptoms result from rapid emptying of the stomach and the discharge of food into the small bowel through a newly created stoma. This rapid entrance of hypertonic material into the jejunum draws fluid into the intestine and causes a reduction in plasma volume. This is followed by compensatory sympathetic stimulation, with sweating and tachycardia. If the ingested material is high in carbohydrate, there may be temporary hyperglycemia followed by hypoglycemia, causing symptoms of "late dumping."

The cause of malabsorption is less well

understood. It is thought to be most common after Billroth II gastric resection. In some cases correction of the Billroth II to a Billroth I procedure will correct the malabsorption syndrome. Malabsorption may result from inadequate stimulation of the flow of bile and pancreatic enzymes, as well as from some abnormality in the afferent limb.

These authors compared the afferent limb of a gastrojejunostomy to a blind loop of small intestine. They considered it possible that there might be an increase in the bacterial flora of the afferent loop, especially when the afferent loop is long. They investigated the possible effect on fat absorption of bacterial growth in the afferent limb of the gastrojejunostomy in patients with Billroth II operations. The reader is referred to the original paper for technical details, but the absorption of radioactive labeled triolene was measured before and after administration of a broad-spectrum antibiotic. Bacterial counts from the afferent limb were also measured. In 4 out of 5 patients in whom impaired absorption was present after Billroth II subtotal gastrectomy, tetracycline administration was followed by a significant improvement in triolene absorption. A gain in weight was observed in 3 of the patients. In 1, however, a resistant type of bacteria developed in the afferent loop and later required other antibiotics to control. Although they admit that their studies do not completely explain the malabsorption syndrome, these authors express the hope that their work has brought forth a new postulate as to the cause and has opened a new door for investigation of this syndrome.

JAMES H. ERWIN, M.D.

Carcinoma of the Endometrium. Pentecost, M. P. Jr., and Brack, C. B., Southern M. J. 52:190, 1959.

Patients who were good operative risks were treated with intracavity radium irradiation followed by conservative total hysterectomy, and those who were poor risks by irradiation alone. A few patients were treated by conservative hysterectomy alone.

Where the carcinoma is completely eradicated by preoperative radium irradiation, the salvage rate is 79.2 per cent, as compared to 50 per cent when persistent tumor is present in the operative specimen.

The salvage rate is 65 per cent for white patients and only 34.4 per cent for Negroes. This is attributed to later diagnosis and a higher percentage of poor operative risks in the Negro group.

EDMUND LISSACK, M.D.

A New Technique for the Experimental Production of Valvular Pulmonary Stenosis. Salerno, R. A., Surgery 46:758, 1959.

This study describes an improved technic for the production of valvular pulmonary stenosis. Physiologic data on chronic survivors are recorded.

Mongrel dogs were employed; the technic was used in conjunction with hypothermia in some cases and with "normal" thermia in others. The approach to the pulmonary valve was made after the method of Swann, and the stenotic lesion was produced by the rapid application of silver clips to obliterate the valve commissures. Of 29 dogs, 22 survived the procedure. Catheterization studies were done on several occasions as was careful postmortem examination at the time the animal died or was killed.

The technic produced true valvular pulmonary stenosis and so accomplished the author's purpose.

CHURCH E. MURDOCK JR., M.D.

Surgical Treatment of Renal Hypertension: Results In Patients With Occlusive Lesions Of Renal Arteries. Poutasse, E. F., J. Urol. 82:403-411, 1949.

The author reviews his cases of occlusive disease of the renal arteries causing hypertension. The vascular causes of hypertension have been revealed by renal angiographic study. He points out that the presence of an occlusive lesion can be suspected from the history, urographic visualization of a smaller kidney and a disparity of excretory function as determined by fractional renal function tests.

From January 1955 through March 1959, 337 hypertensive patients were examined by renal angiographic study. Eighty-seven had occlusive arterial disease of one or both renal arteries. At the same time, only 6 cases of pheochromocytoma were observed.

The indications for renal angiographic examination are (1) disparity in length or excretory function of kidneys as noted on the excretory urogram; (2) hypertension in a patient less than 35 years of age; (3) malignant hypertension developing in a patient over 55 years of age; (4) hypertension of recent origin in a patient of any age, with progression to the malignant stage, and (5) hypertension developing after a recent episode of flank pain.

The majority of the arterial lesions were arteriosclerotic plaques. Thrombosis without other pathologic changes was observed in 5 patients, and small dissecting aneurysms of the renal artery were noted in 3.

Sixty-six of the 93 hypertensive patients were operated upon, nephrectomy being the procedure employed for 39. Nephrectomy was done because the illness was too severe to justify a more difficult operation, because repair of the artery was not technically feasible or because the involved kidney showed significant atrophy radiologically and by functional studies. The remainder underwent segmental nephrectomy, endarterectomy, excision of the occluded arterial segment, renal arterial homografting or splenorenal arterial anastomosis.

Of the 30 living patients, 25 have had complete remission of the hypertension; 2 have had reversal of malignant hypertension and reduced pressure, and 3 have shown no change in blood pressure.

SHEPARD JEROME, M.D.

Substances Released from the Skin Following Thermal Injury. Rosenthal, S. R., Surgery 46:932, 1959.

The existence of a "burn toxin" has been discussed over the years. Most investigators have concluded that no true toxin exists. Others, however, have stated that when fluid loss is compensated for by the use of blood, plasma, saline solution and other materials, a decrease in cardiac output is still manifest. It is the opinion of some that this decrease in cardiac output can be best explained by some type of "burn toxin."

The author describes the method used for collecting diffusates from the skin of burned experimental animals and the result of injection of these diffusates into controls. Selected areas of rats were burned with hot water, and the diffusates that formed were collected and lyophilized. The diffusates obtained directly from burned rat skin were lethal to mice and rats. These diffusates were obtained by circumventing the circulation.

The author concludes that there is a "burn toxin" as yet not completely isolated, but lethal when given subcutaneously, intravenously, intraperitoneally or intracerebrally. The chemical properties of this unknown toxin are discussed. It is stated that histamine and other compounds may be contributory lethal factors but are not synonymous with the toxin under consideration.

JAMES H. ERWIN, M.D.

A Comparative Analysis of Two Procedures for Chronic Duodenal Ulcer, Antrectomy with Vagectomy or Partial Gastrectomy with Vagectomy. Palumbo, L. T., Sharpe, W. S., Lulu, D. J., Vespa, R., and Colon-Bonet, J.: Arch. Surg. 80:83, 1960.

Antrectomy with bilateral infradiaphragmatic vagectomy for chronic duodenal ulcer is at present the authors' operation of choice. The results of this procedure, compared with others they have used in the past, particularly with regard to partial gastrectomy with vagectomy, far exceed them in every respect.

Antrectomy with vagectomy is the operation of choice because it offers (1) lower morbidity and mortality rates; (2) more rapid rehabilitation; (3) fewer side effects; (4) shorter operating time and hospital stay; (5) the least chance, if any, of recurrent or marginal ulcer, and (6) overall results superior to those of partial gastrectomy with vagectomy or other operative procedures.

WILLIAM E. NORTH, M.D.

Results of Shunt Procedures in Tetralogy of Fallot. Shumacker, H. B. Jr., and Mandelbaum, I., Surgery 47:320, 1960.

The authors examine 115 shunt procedures performed on 106 patients with the tetralogy of Fallot. The overall mortality rate in this group of patients was 4.7 per cent. By detailed breakdown of the statistics presented, the authors demonstrate that, if one considers the problems from the proper perspective of risk and improved surgical technics, it is not inconceivable to anticipate that in the "good risk" patient the shunt procedures should not carry a mortality rate of more than 1 per cent. For infants or very poor risks, however, a mortality rate of 5 to 10 per cent may persist, owing to the status of the disease.

The overall purpose of this presentation is to call attention to the fact that full correction, by an open heart procedure, of the complex abnormality known as the tetralogy of Fallot still carries a relatively high mortality rate and that surgeons must demonstrate unequivocally the superiority of this approach, as well as a decreasing mortality rate, before accepting such procedures in preference to shunt procedures, which have proved quite valuable.

CHURCH E. MURDOCK JR., M.D.

Wilms's Tumor: An Evaluation of Prognosis and Treatment. Owings, R. S., and Radakovich, M., Surgery 46:864-869, 1959.

The authors report 18 cases of Wilms' tumor treated at the University of Rochester Medical Center during the past thirty years.

Because of far advanced metastasis patients were treated by irradiation alone, and all died. Exclusive of these 3 patients the survival rate was 66 per cent for those treated by operation and irradiation. Among patients with two or more symptoms the mortality rate was higher.

The authors did not use the usual eighteen-month post-therapy period as a survival criterion. They used a sliding-scale period of risk that includes the gestational period of nine months, plus the age of the patient at the time of diagnosis. The prognosis is much better if diagnosis and treatment are established before the child is 18 months of age.

These authors also point out the high incidence of skeletal change following irradiation.

SHEPARD JEROME, M.D.

Immunology of Cancer. Black, M. M., and Speer, F. D., Internat. Abst. Surg. 109:105, 1959.

In view of the complexity of immunologic phenomena as related to human carcinoma and the need of further knowledge in this field, it is difficult to understand the paucity of studies of patients with carcinoma as contrasted with the plethora of studies on transplantable tumors in experimental animals, the preoccupation with tissue culture cancer, and the varied and numerous *in vitro* and *in vivo* experiments performed, often with an obscure relation to carcinoma in man. It seems quixotic that the wealth of available technical skill is not being applied to the human patient. It is suggested that it would be profitable not to study mice less but to study human beings more.

EDMUND LISSACK, M.D.

Must All Cases of Chorioepithelioma Die? Acosta-Sison, H., Philippine J. Cancer 1:226, 1959.

The author presents 12 patients with chorio-epithelioma admitted to the Philippine General Hospital between 1950 and 1954, all of whom died. One was untreated and the other 11 were operated on late, after metastasis had occurred in a pronounced degree. In this author's opinion, the age-old practice of first performing biopsy in the presence of obvious signs of malignancy is wrong, as it may cause extensive hemorrhage and death, or at least cause the loss of precious time needed in saving the patient's life by early radical operation, followed by the administration of large doses of long-acting testosterone. On the other hand, he readily admits that the difficulty of diagnosis often makes death unavoidable.

JOHN A. ZIEMAN, M.D.

Management of Ovarian Carcinoma in 123 Patients, with Particular Emphasis on the Prophylactic Use of Radioactive Gold. Weed, J. C., and Barraza, D. F., Southern M. J. 52: 278, 1959.

Drs. Weed and Barraza found the intracavital use of radioactive gold effective in the management of pseudomyxoma peritonei.

One hundred and twenty-three women with ovarian carcinoma were treated at the Ochsner Clinic between Jan. 1, 1942, and Sept. 1, 1958. Of these 22.7 per cent are alive, but of those treated before 1953 only 17.1 per cent survive.

Ovarian carcinoma remains a deadly menace. Unless it is detected early in its course, the survival rate is generally poor in spite of surgical therapy, roentgenotherapy and chemotherapy.

EDMUND LISSACK, M.D.

Mecanique de l'Appareil Biliaire Extrahepatique (Mechanics of the Extrahepatic Biliary System). Roux, M., and Vayre, P., J. de chir. 78:38, 1959.

Bile flow through the extrahepatic biliary system is controlled by (1) the hydrodynamics of the biliary tree; (2) the nervous system; (3) hormones, and (4) drugs.

1. *Hydrodynamics:* The initial pressure in the gallbladder as well as the bile ducts is 9 to 10 cm. of water. When the gallbladder contracts during digestion under the effect of cholecystokinin, however, the pressure of passage through the cystic duct is about 17 cm. of water. The sphincter of Oddi opens under pressure of 12 cm. of water, which allows the flow of bile into the duodenum.

2. *Innervation:* The extrahepatic system is under the effect of the vagus, especially the right one, which reinforces the tonicity of the system, whereas the sympathetic and, especially, the right splanchnic nerve are inhibitory. Denervation of this system does not affect its tonicity, which is controlled by an autonomous intramural nervous plexus.

3. *Drugs:* The pharmacodynamic effects of various drugs are studied. One group increases the pressure in the system (mainly morphine hydrochloride and, to a lesser degree, the adrenergic and cholinergic drugs) and another group decreases the pressure: amyl nitrite, atropine sulfate, tetraethylammonium bromide, chlorpromazine and curare-like products in high dosage.

SAFUH M.A. ATTAR, M.D.

An Experimental Procedure for Correction of Transposition of the Great Vessels. Glotzer, P., Bloomberg, A. E., and Hurwitt, E. S., Arch. Surg. 80:20, 1960.

The authors describe a method of venous transposition that has been tested in approximately 10 laboratory animals and 1 human patient. As in every such procedure, the advantages of venous transposition over attempts at correction of transposition of the great vessels are evident. Experimentally, and at autopsy in a single clinical case in which the procedure has been employed, a successful complete transposition of the venous circulation was achieved.

The method involves the creation of a large interatrial septal defect following which a patch of Dacron, shaped like an hourglass, is sutured over the posterior wall of the left atrium in such a manner as to encase the orifices of the pulmonary veins. The opposite end of the hourglass patch is then sutured about the tricuspid annulus, and the waist of the hourglass is sutured in the interim crossing the medial aspect of the tricuspid annulus and the medial posterior aspect of the now deficient interatrial septum to channel the pulmonary venous return along the floor of the atria and into the tricuspid valve. The large interatrial septal defect remains, permitting flow of the venous blood into the left ventricle.

The authors express enthusiasm for this method because of its basic simplicity.

CHURCH E. MURDOCK JR., M.D.

MEDICAL DIPLOMACY—

"World peace cannot be attained until we build peace into the hearts and minds of men. Since physicians are the most intimately acquainted with the physicial and mental needs of their patients, they are the most logical engineers for this great moral construction project. If we, more than half a million physicians, assume this task on an individual, personal basis, we may yet succeed where soldiers, statesmen and politicians have previously failed."

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